Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

February, 1936

NEW! for Your requirements

JUNIOR MODEL

TYPE VA SELECTRO

Standard Sizes
18 to 30" in width
48 to 96" in length
1-2 or 3 decks
OPEN or Enclosed

Built Like the Large VB SELECTRO
With All the Desirable Features

- Oil (splash) Lubrication
- Adjustable Throw (or eccentricity)
- Full Tilting—Full Floating
- Built-in Safety—Ruggedness
- Day-in day-out Operation Built-in

PRODUCTIVE EQUIPMENT CORP.

210 East Ohio St. Chicago

★ Pages 23-27

Since 1929 the largest net paid A. B. C. producer circulation in the field

THE WALKER has reserve power a-plenty —to fill the bucket to overflowing— hoist rapidly . . . swing the machine quickly. No time lost here—and no time lost in moving because, due to the walking traction, the machine takes the shortest path between working points. Investigate The Walker for your next job. Manufactured by Bucyrus-Monighan Company, Chicago, Illinois.

action

Sold by

BUCYRUS-ERIE

EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

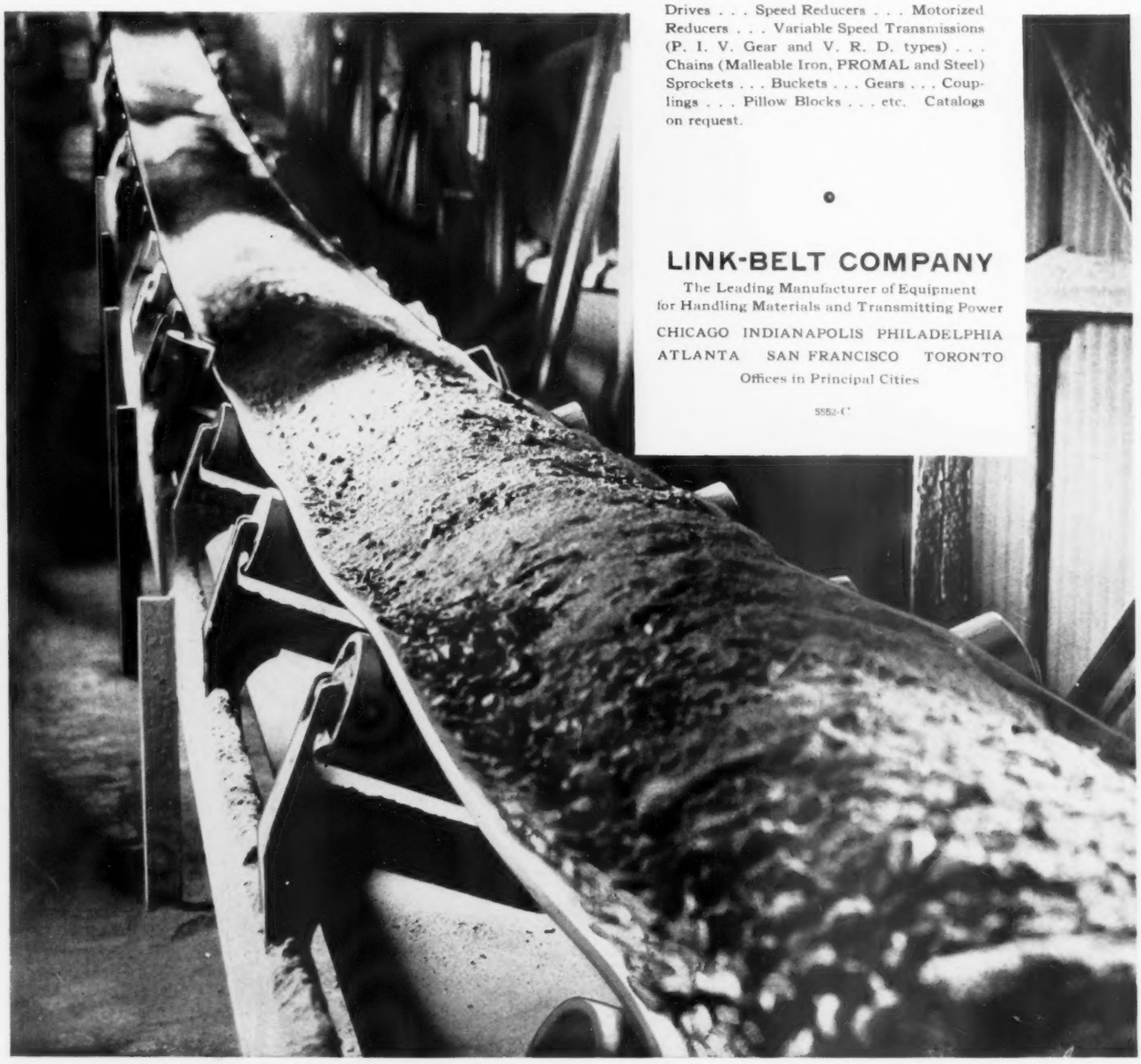
KEEP YOUR CONVEYING COSTS DOWN!

USE LINK-BELT ANTI-FRICTION IDLERS

● Free-turning, accurately made idlers assure the belt conveyor a good roadbed for economical operation . . . minimum friction loads . . . long belt life . . . and the lowest maintenance cost. Link-Belt makes a full line of anti-friction pressure-lubricated idlers, as well as all necessary machinery and driving parts for the complete conveyor.

Submit your conveyor and power transmission problems to Link-Belt. Send today for Catalog. Address nearest office.

LINK-BELT PRODUCTS INCLUDE: Complete Sand, Gravel, and Stone Washing Plants . . . Screens (vibrating, rotary and conical) . . . Washers and classifiers, of the screw, log, flight, Shaw, Rotoscoop, and conical types . . . Conveyors and Elevators (belt, flight, screw, bucket, all approved types) . . . Crawler Shovels-Draglines . . . Portable Loaders . . . Silverstreak Silent Chain Drives . . . and Silverlink Roller Chain Drives . . . Speed Reducers . . . Motorized Reducers . . . Variable Speed Transmissions (P. I. V. Gear and V. R. D. types) . . . Chains (Malleable Iron, PROMAL and Steel) Sprockets . . . Buckets . . . Gears . . . Couplings . . . Pillow Blocks . . . etc. Catalogs on request.



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The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

CHICAGO INDIANAPOLIS PHILADELPHIA ATLANTA SAN FRANCISCO TORONTO

Offices in Principal Cities

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Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 28 FEBRUARY, 1936 Number 8

MEMBER AUDIT BUREAU OF CIRCULATIONS

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an ATLAS DIESEL *handled the* AGGREGATE

In the piers and anchorage of the Golden Gate Bridge, greatest of all the world's suspension bridges, there are more than 260,000 cubic yards of concrete. That is sufficient concrete to build a solid shaft 25 feet square and two miles high.

Practically all of the aggregate for this huge amount of concrete was furnished by Pacific Coast Aggregates, Inc., which operates 25 modern sand and gravel plants in Northern California. The aggregate for the Golden Gate Bridge came from the Livermore Valley and the picture below shows how an ATLAS DIESEL powered Brownhoist locomotive crane handled the aggregate.

The Livermore plant has a capacity of 350 tons per hour and the ATLAS DIESEL powered Brownhoist is used for switching, loading and unloading railway cars. At their Niles plant, a few miles away, is another ATLAS DIESEL powered Brownhoist, working in conjunction with a similar unit powered by steam.

The ATLAS DIESEL powered Brownhoist has an average fuel cost of $25.00 per month or about a dollar a day. The steam rig shows a fuel cost of $5.50 per day. In addition to the high fuel cost there is an additional waste of time and fuel steaming up in the morning, and constant interruptions in having to shut down for water.

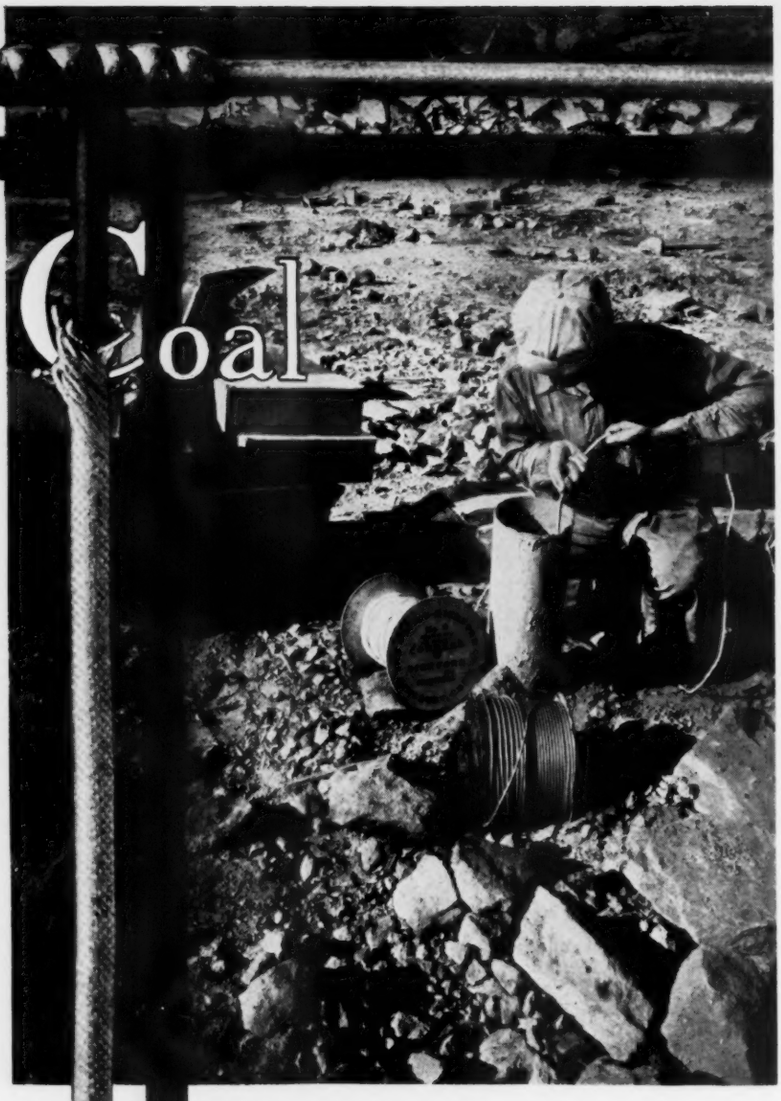
Comparative figures like these have influenced the construction industry to "go Diesel" and that means ATLAS DIESEL. There are today more ATLAS DIESELS powering shovels, excavators and draglines and locomotive cranes than the engines of all other manufacturers combined. The construction industry "dishes out" tough jobs—and Atlas Diesels can "take it."

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIFORNIA ■ MATTOON, ILLINOIS

ATLAS IMPERIAL

Stripping *with* CORDEAU BICKFORD *at the* Lehigh Navigation Coal Company



In the strip pit one mile long and 1,500 feet wide, an average of 10,000 cu. yds. of rock overburden is blasted and removed every twenty-four hours. The Mammoth anthracite vein, pitched at 45°, is from 40 to 125 feet thick and yields an average of 3,000 tons of coal during this period.

Here is a production cycle that allows little time for fancy juggling with steam shovels, or mud capping to obtain proper fragmentation. The overburden is an "overhead" that must be removed as quickly and easily as possible.

Cordeau-Bickford Detonating Fuse is used throughout these stripping operations because *it pays in five ways:* (1) *Simplified Loading*—no caps in the holes. (2) *Less Hazard*—Cordeau is insensitive to ordinary shocks. It must be detonated in order to detonate the loads. (3) *More Work from Explosives*—each cartridge, being detonated directly by the Cordeau, has the added force of a *primer* cartridge. (4) *Fewer but Bigger Shots*—Cordeau not only detonates each hole but connects all holes, producing the Giant Blast. Equipment moved less often. (5) *Better Fragmentation*—planned rotation secured with a Cordeau hook-up permits relief of burden, and allows each charge to exert its force to the best advantage.

Cordeau-Bickford Detonating Fuse is manufactured with the same precision that has made Ensign-Bickford Safety Fuse famous since 1836. Let us send you a copy of our Centennial Book—and tell you more about Cordeau.

CB50

***The* ENSIGN-BICKFORD COMPANY Simsbury, Conn.**

SAFETY FUSE *Since 1836* • CORDEAU-BICKFORD DETONATING FUSE

A NEW BUSINESS OPPORTUNITY

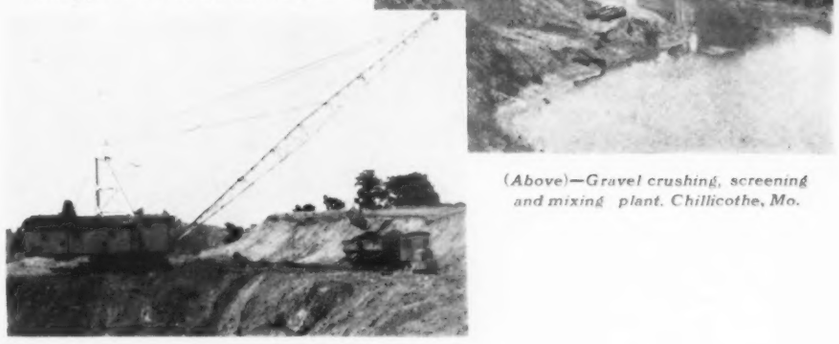
FOR AGGREGATES PRODUCERS

STABILIZED ROAD MIX

REQUIREMENTS of local governments and relief projects provide a ready market for road surfacing materials, especially "stabilized" soil mixture—the one best bet for building high-type, low-cost secondary roads.

Many foresighted aggregate producers have recognized this type of highway as the long-sought farm-to-market road, dustless in summer, smooth in winter, sound in spring and fall. Many have already adapted pit, quarry, brick-yard and other equipment to produce this material to supply the ever-increasing demand. It is the farm-to-market road of the future—the ideal small city street—the big city off-pavement highway—and the perfect park or private driveway.

The great value of this opportunity to aggregate producers lies in its long season market, its utilization of finer aggregates, and particularly the use of pit or quarry overburden soils of sand and clay. "Stabilized mix" is a business that requires only a moderate amount of added equipment.



(Below)—Drag-line loading and proportioning gravel and overburden for plant.

(Above)—Gravel crushing, screening and mixing plant. Chillicothe, Mo.

How to build a soil stabilization plant is explained in our new bulletin number 24, just off the press. It will put many a pit and aggregate producer on his way to profit. Nineteen thirty-six is the year for secondary roads; now is the time to start. Write for bulletin number 24 today.

Calcium Chloride Association

The Dow Chemical Company, Midland, Michigan
Michigan Alkali Co., 60 E. 42nd St., New York City
Solvay Sales Corp., 40 Rector St., New York City
The Columbia Alkali Corp. . . Barberton, Ohio

CALCIUM CHLORIDE

FOR STABILIZING ROAD SURFACES

AMERICAN TIGER BRAND WIRE ROPE

THE TIGER *puts his Foot Down on Excessive Costs!*

THE TIGER trade mark for genuine American Tiger Brand wire rope tells a story of savings that extend over maximum periods... performance proved in service . . . quality developed for your specific needs.

AMERICAN TIGER BRAND WIRE ROPE

ELECTRICAL WIRES & CABLES

AMERCLAD ALL-RUBBER CABLES

AERIAL TRAMWAYS

TIGER WIRE ROPE CLIPS

WIRE ROPE FITTINGS

AMERICAN STEEL & WIRE COMPANY

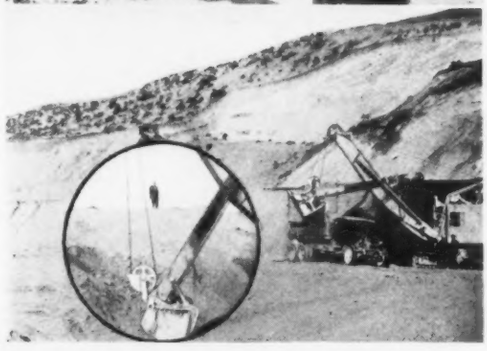
208 S. La Salle Street, Chicago Empire State Building, New York

Pacific Coast Distributors: Columbia Steel Co., San Francisco

Export Distributors: United States Steel Products Co., New York City

UNITED STATES STEEL

UNIVERSALLY USED!



All equipped with AMSCO Renewable Lip Dippers!

1. A KOEHRING No. 601
2. A 1½ yd. LORAIN 77
3. A 1½ yd. LIMA No. 601
4. A 1¼ yd. K-40 LINK-BELT
5. Two 2¼ yd. NORTHWESTS

Did you notice almost every shovel shown at the Road Show was equipped with an AMSCO Renewable Lip Dipper?

AMSCO RENEWABLE LIP ONE-PIECE DIPPERS

On almost every big construction job as well as in mines, quarries, and stripping operations — on all makes and sizes of shovels, you'll find AMSCO Renewable Lip Dippers. Because they're *faster loading* and *quicker dumping!* Because the lips are easily renewed in the field without riveting. Because the one-piece all manganese steel body and rugged door construction provide a vastly longer service life.

AMSCO Renewable Lip Dippers effect such great savings in added yardage handled, and speed up digging operations so much that they often show appreciable savings over the cost of keeping old dippers in operation.

Put an AMSCO Renewable Lip Dipper on your shovel stick as soon as possible to greatly increase your digging profits!

AMSCO Renewable Lip Dippers are made in all sizes from ½ to 18 yards for all makes of shovels, with back lugs arranged to fit any dipper stick. Get details and prices today from your shovel manufacturer or our nearest office!

AMERICAN MANGANESE STEEL COMPANY

Division of American Brake Shoe & Foundry Company

396 East 14th Street, Chicago Heights, Ill.

Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities

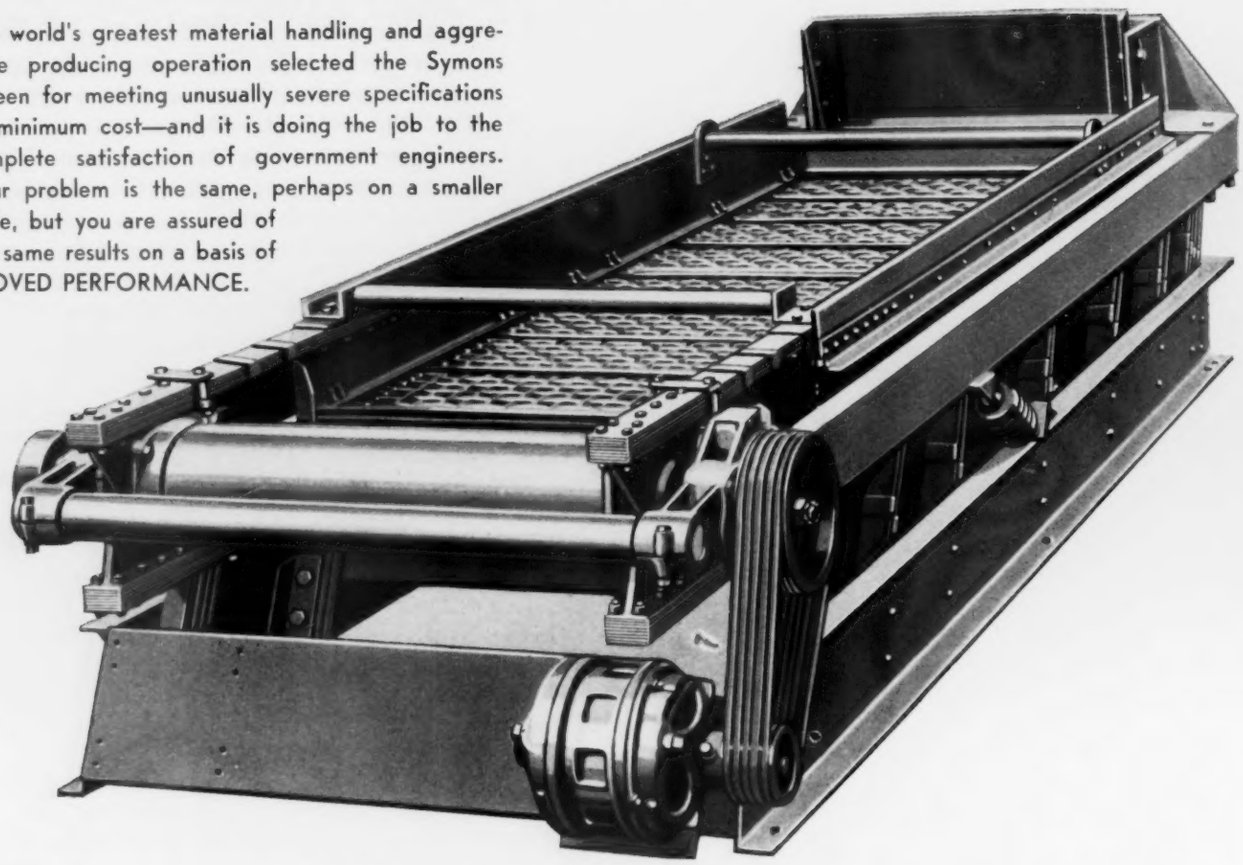
AMSCO

TRADE MARK REGISTERED

If it's good enough for GRAND COULEE DAM—

Isn't it good enough for you?

The world's greatest material handling and aggregate producing operation selected the Symons Screen for meeting unusually severe specifications at minimum cost—and it is doing the job to the complete satisfaction of government engineers. Your problem is the same, perhaps on a smaller scale, but you are assured of the same results on a basis of PROVED PERFORMANCE.



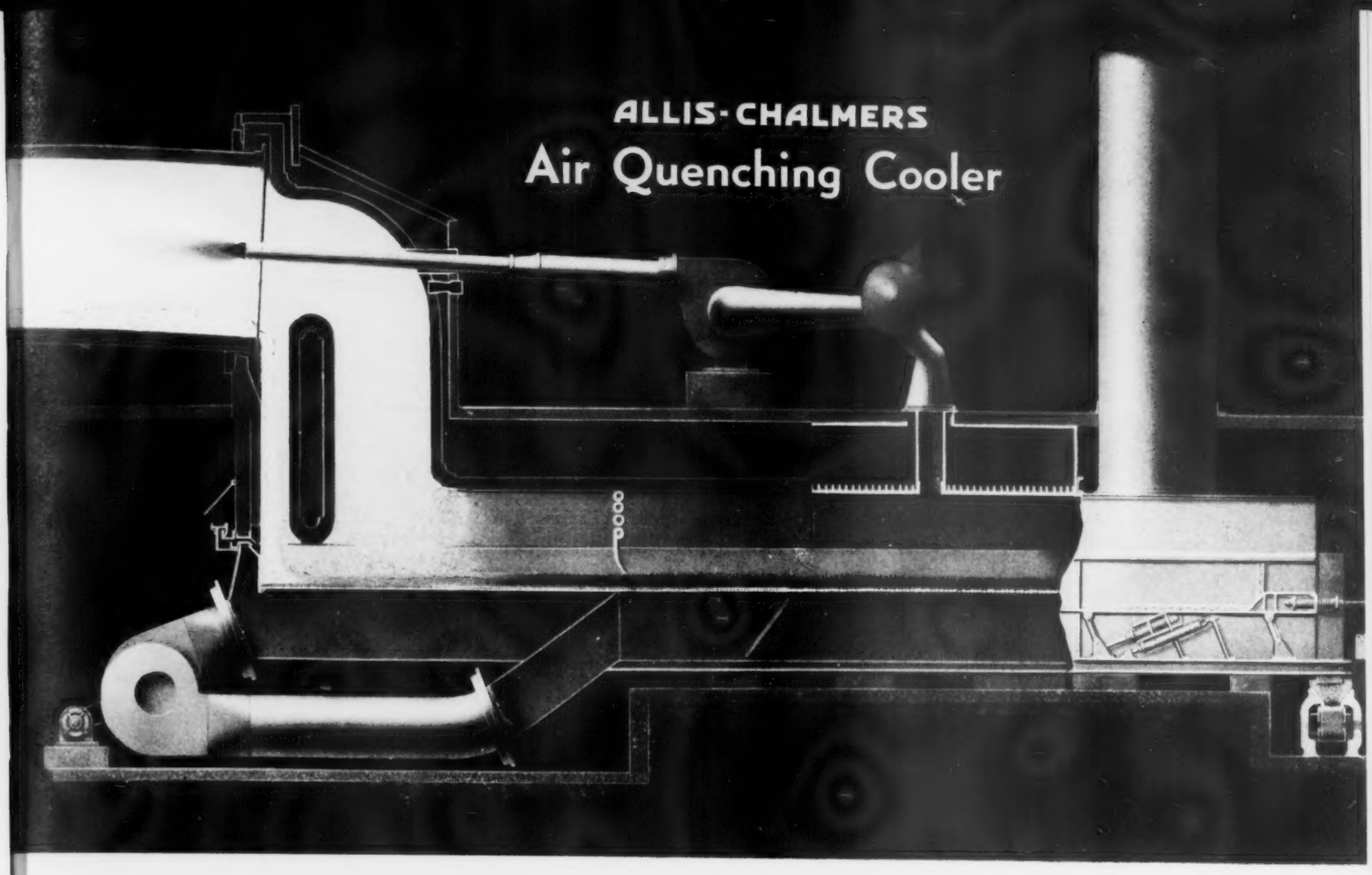
SYMONS SCREENS bring to industry

a new standard of screening efficiency due to a combination of advanced features and advantages, found only in the Symons:

Screen sits level and saves headroom.
Even, accurate grading without cascading along deck.
Automatic feed and dust-tight bearings.
Weight of screen not carried on bearings.
All vibrating parts are counterbalanced.
No destructive grinding action between material and cloth.
Readily enclosed for dusty operations.

MANUFACTURED AND SOLD BY

SYMONS BROS. DEVELOPMENT CO.
1462 North Stanley Avenue, Hollywood, California
and
NORDBERG MANUFACTURING CO., Milwaukee, Wis.



Air Quenched Clinker

Improves Cement Quality . . . Lowers Costs

This type of Cooler air quenches clinker by forcing a blast of cool air upward through a CONSTANTLY AGITATED clinker bed of UNIFORM THICKNESS. The COOLEST air makes contact with the HOTTEST clinker.

The depth of clinker on the grate is maintained by means of a pressure switch connected to the air supply which automatically controls the speed of the cooler driving motor to accommodate variations in the rate of feed.

Cooling air is supplied to the initial quenching zone at a pressure of 4" water gauge by means of a separate fan. This permits accurate automatic control of the secondary air supply to the kiln through the use of flow control apparatus operating in connection with this fan.

Another fan supplies cooling air to the balance of the cooler at a pressure of 2" water gauge. This system of cooling air supply not only insures a flexible means of air control but also results in a saving in power as only that portion of the air required at a relatively higher pressure is compressed to this pressure. In single fan systems all of this air must be compressed to the highest pressure required.

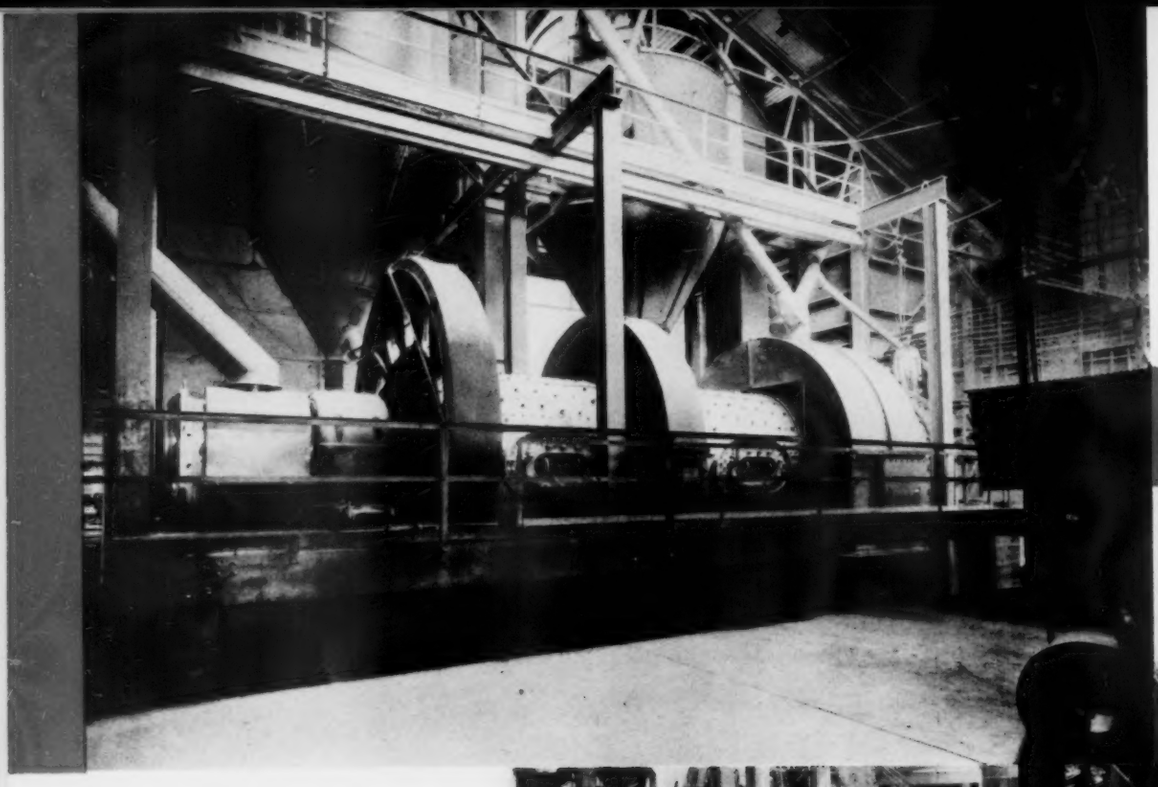
Thermostatically controlled blending dampers automatically maintain the primary air supply at a uniform temperature and quantity at any desired degree of preheat.

The Allis-Chalmers Air Quenching cooler not only quickly cools the material treated but also supplies preheated primary combustion air at an automatically controlled temperature. The amount of preheated secondary combustion air is also controlled.

Twelve of these new and better coolers have been built or are under construction for installation in eight cement and lime plants in this country and abroad. Write the nearest Allis-Chalmers Office for a copy of Bulletin 1477 with data sheet.

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —



Left: Progressive Grinding Compeb Mill.

Below: Kiln with Enlarged Calcining Zone.

. . . for Better Cement at Lower Cost

Within the last few years Allis-Chalmers has made three major improvements in cement manufacturing machinery, all aiding in the production of better cement at lower cost.

The air quenching cooler is described on the front of this page. Progressive grinding compeb mills, with air separation, give lower power consumption and a wide range of fineness control.

Rotary kilns with enlarged calcining zones were first introduced in the United States by Allis-Chalmers. This design results in an improved and more uniform product and a saving in fuel due to more efficient heat transfer in the calcining zone. Get in touch with the nearest Allis-Chalmers Office.

Cement Machinery

- Dust Collectors (Bag Filter Type)
- Grinding Mills (Compeb, Preliminator, Ball, Ball-Peb and Tube)
- Grinding Media
- Pulverized Coal Plants
- Rotary Kilns, Coolers and Dryers
- Air Quenching Coolers
- Slurry Agitators
- Wash Mills for Clay
- Complete Cement Making Plants
- Complete Lime Plants

Crushing Machinery

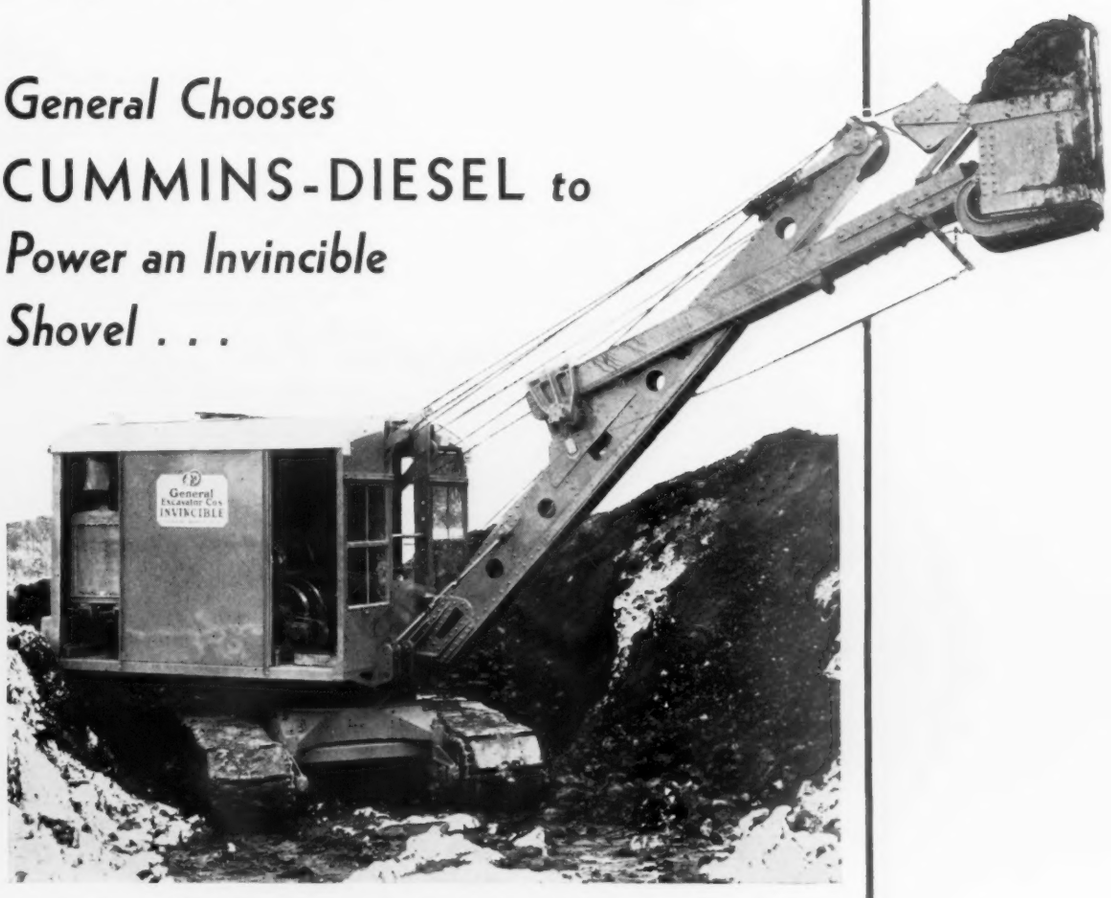
- Crushers, (Gyratory, Jaw, and Fairmount Single Roll)
- Crushing Rolls
- Elevators, Conveyors, Feeders, and Bin Gates
- Hoists (Electric and Friction)
- Mobile Crushers and Auxiliaries
- Pulverators (Hammer Type Impact Crushers)
- Screens (Revolving and Vibrating)
- Scrubbers and Washers
- Sizers (Multi-roll)
- Complete Crushing Plants
- Complete Sand and Gravel, Washed Stone, Agricultural Limestone, Oyster Shell, and other Comparable Plants

Other Machinery

- Electric Motors
- Texrope Drives
- Centrifugal Pumps
- Power Plant Equipment
- Blowers and Compressors
- Wheel and Track-type Tractors
- Track-type Wagons

Read the record

General Chooses CUMMINS-DIESEL to Power an Invincible Shovel . . .



This is the first of a number of Invincible Shovels to be powered with Cummins-Diesels.

A company who puts everything they have into building a shovel and features it as: "The finest excavating machine we know how to build . . . the excavating machine of tomorrow" . . . is certain to be especially careful in their choice of an engine with which to power it.

General Excavator Company's selection of the Cummins-Diesel is significant.

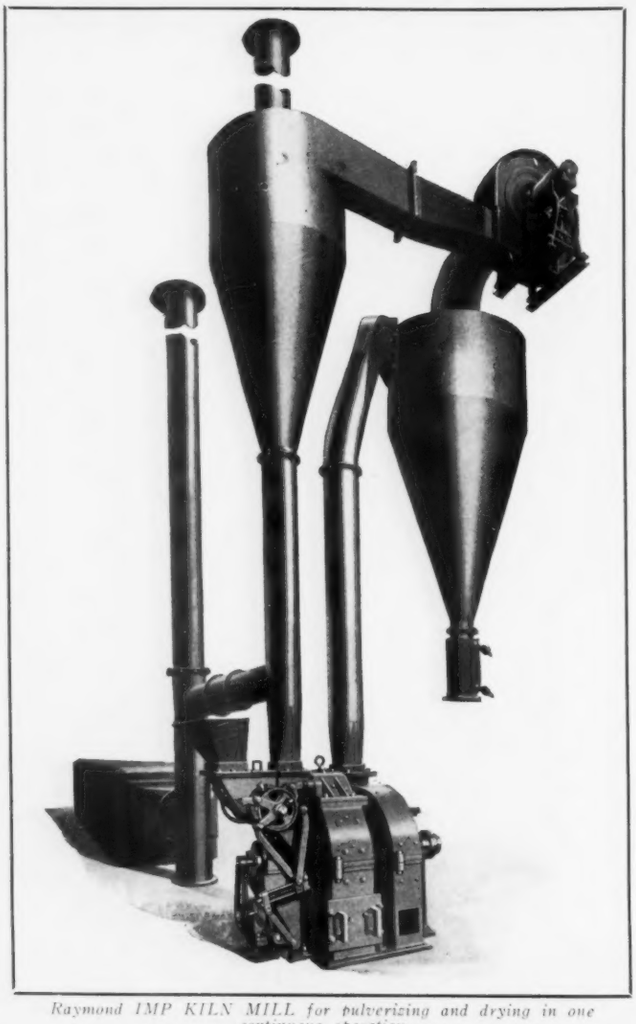
Whether you are considering the purchase of new machinery and trucks or planning the replacement of obsolete, worn-out power equipment, it will pay you to investigate the exclusive features in the Cummins-Diesel, which make it the choice of experienced engineers.

Talk with your nearest Cummins dealer or write direct to the Cummins Engine Company, 801 Wilson Street, Columbus, Indiana.

Ask for a copy of the new book "*Read the Record.*" It gives the facts about Cummins-Diesels.

CUMMINS
INDUSTRIAL • AUTOMOTIVE AND MARINE
DIESELS

Removing Moisture from CLAY by Flash DRYING SYSTEM



Raymond IMP KILN MILL for pulverizing and drying in one continuous operation

THE removal of moisture from a dense, sticky material like clay is a problem readily solved by the use of a Raymond Mill with Flash Drying System.

The speed and simplicity of this method is shown by results obtained in a recent installation of two Kiln Mills of the Imp type for handling a special clay material.

The clay is fed from the bin into the mill as a wet, lumpy mass carrying about 20% of moisture. The Imp Kiln Mill breaks down the clay into fine particles, which are instantly stripped of their moisture by a hot blast of air passing through the grinding chamber.

One pass through the mill brings down the moisture content to one per cent or less, and reduces the material to a fineness of 99% minus 150-mesh. The output of each unit is about 1500 pounds per hour of dry product, which means a water evaporation of more than 350 pounds per hour—a highly efficient operation.

If you have a drying-and-grinding problem on clay, limestone, gypsum or other rock products, Raymond engineers will help you work out an economical method of doing the job.

RAYMOND BROS. IMPACT PULVERIZER CO.
Division of Combustion Engineering Company, Inc.
1321 North Branch Street, Chicago
Sales Offices in all Principal Cities
Canadian Representative:
Combustion Engineering Corporation, Ltd., Montreal

RAYMOND

PULVERIZING • SEPARATING • FLASH DRYING • DUST COLLECTING

Obviously

WIRE SCREEN IS ALL WIRE!

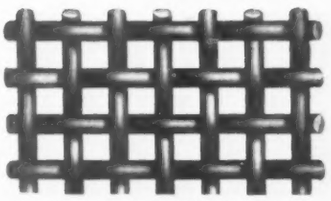
A wire screen is just as good and no better than the wire of which it is fabricated. Screening will give long, trouble-free service only if strength and stamina are inherent qualities of the wire which goes into the screen.

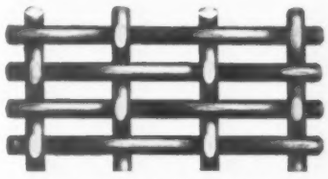
Making wire has been Roebling's business for 90 years—over 50 years in the making of wire fabric. This background—these years of experience which go into every screen we deliver, are available to help in the solution of your wire screen problems.

Roebling Wire Screens for sizing, cleaning and grading are made in a variety of types and metals to meet even the severest requirements as to efficiency and resistance to vibration and abrasion.

We would welcome your inquiry and an opportunity to cooperate with you.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*


Square Mesh Wire Screen

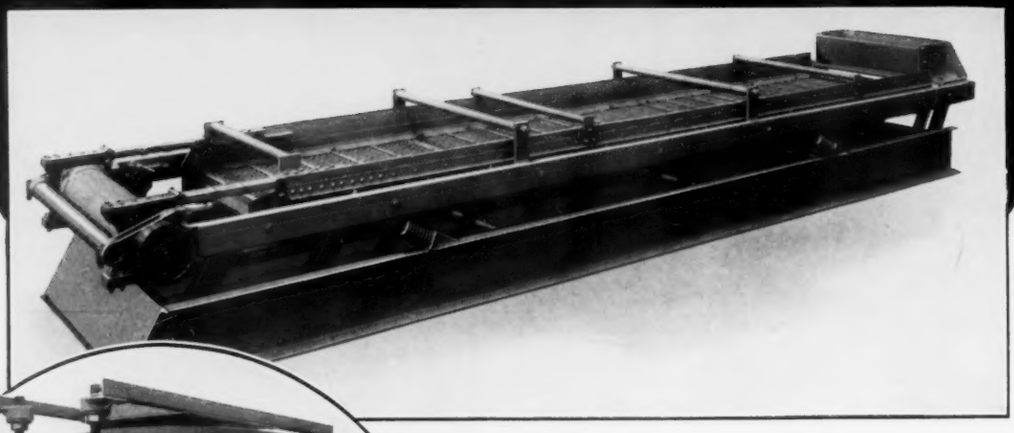

Oblong Mesh Wire Screen

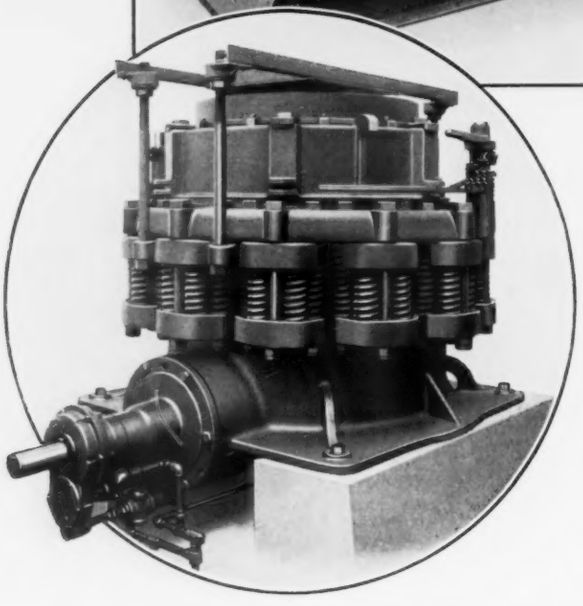
ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY

SYMONS CRUSHERS AND SCREENS





They meet the requirements of increased capacity of better products

The choice of practically all the major producers of finely crushed materials is ample evidence of the unequalled performance given by Symons Cone Crushers. With the steadily increasing demand for finer products, this machine fulfills the requirement for greater capacity at lower cost.

The flat Symons Screen is equally outstanding. With its different screening action and being placed level, it assures of better sizing and materials that meet the most rigid specifications as demanded today. A level screen also permits of a variety of arrangements to best meet different conditions.

If you are considering any change in your crushing or screening equipment, see what Symons will do.

NORDBERG MFG. CO. MILWAUKEE, WISCONSIN

NEW YORK CITY
60 East 42nd St.

LONDON, W. C. 2
Bush House

LOS ANGELES, CALIF.
Subway Terminal Bldg.

KOEHRING

new! TRAIL DUMP

KOEHRING HEAVY DUTY

MONO-PLATE box type welded body construction . . . inherent strength for rigidity and elimination of distortion and weave on uneven grade . . . light weight for maximum pay-load ratio . . . free swinging doors, instantaneously opened, at all speeds . . . "automatic hand" closes doors immediately, at operator's will, when pulling away from the load . . . high arched rear axle for maximum dumping clearance.

APPROXIMATELY twenty miles per hour for fast road travel . . . short turning radius at the dump and loading point . . . "non-raring" hitch ahead and below the drive axle for maximum pull . . . ample power and lug type tractor tires give positive traction for quick and nimble movement . . . low, wide body for fast and convenient loading . . . seconds saved every trip . . . more profit per job.

KOEHRING COMPANY

Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

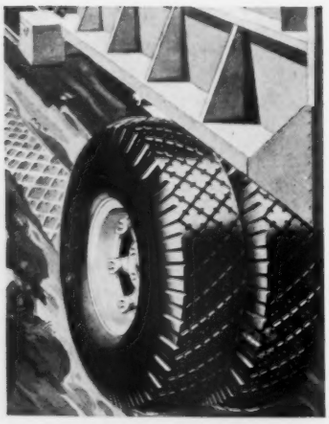
3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

★

● Mr. J. P. O'CONNELL, *standing beside one of his General-equipped fleet of 33 transit mixers and dump trucks.*

★

FIVE HUNDRED MILES A WEEK FOR YEARS without a blowout!



The General Heavy Duty Traction Balloon is made to order for the toughest construction jobs. It is only one of the complete line of Generals—each designed and built specifically to do a certain job better.

● J. P. O'Connell Company of Boston, mason's supplies and ready mixed concrete, operate 33 transit mixers and dump trucks.

Shuttling back and forth, day and night, between plant and the job, mixing concrete as they run or hauling huge loads of sand, gravel and bags of cement—demands tires that can "take it".

The transit mixers frequently run 72 hours at a stretch with relays of drivers—and are doing it today, supplying concrete for the $3,000,000 bridge across Fore River between Quincy, Mass., and Weymouth.

Under this extreme type of service, J. P. O'Connell Company have yet to have a blowout. The entire fleet is 100% General Tire equipped.

Your General Tire dealer has the most complete, most highly specialized line of truck tires in the business. He is a practical truck tire man with wide experience and accurate knowledge in fitting the right type and size of tire to every job. He can cut your costs. Let him prove these statements.

FREE this valuable booklet on how to get more service from your truck tires. Write to The General Tire and Rubber Company, Akron, Ohio.

GENERAL TRUCK TIRES

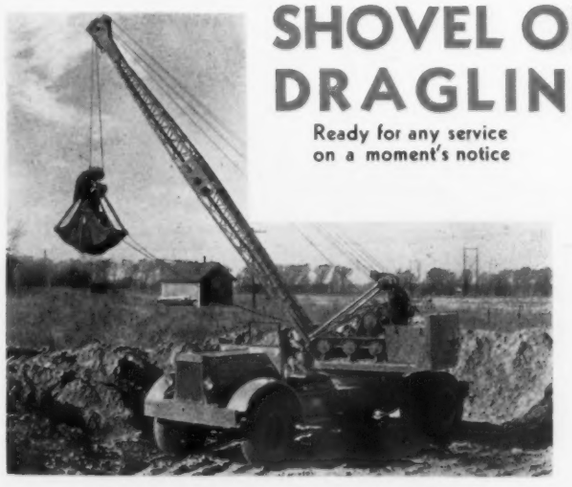
THREE REASONS WHY GENERALS ARE MORE PROFITABLE TO YOU

1. Generals are stronger tires—additional full width plies of powerful cord are anchored bead to bead—with no "idle" plies—no floating breaker-strips.

2. Generals are cooler tires—they flex uniformly without that heat-producing "hinging action" of ordinary breaker-strip tires.

3. Generals have "compact rubber" treads—their construction keeps the tread rubber compact and compressed so that it wears slowly and gives more miles.

SWING INTO 1936 with the New MICHIGAN



SHOVEL OR DRAGLINE

Ready for any service on a moment's notice

MICHIGAN FEATURES

True Finger-Tip Clutch Control.
Speedy Operation assures Extra Capacity on any Job.
High-speed Air-controlled Shovel Mechanism with Ball Bearing Top and Hook Rollers.
Wide Range of Application for use in connection with Portable Plants.

The Michigan for Mobility

With the widespread use of portable plants, there comes a universal demand for a modern power shovel unit that is quick to move from place to place, and easy to maneuver on the job for any kind of material handling service. The new MICHIGAN Model T-6 Truck Shovel meets these requirements, because it is especially designed for the purpose. Its performance in the field marks it as America's finest completely mobile shovel unit.

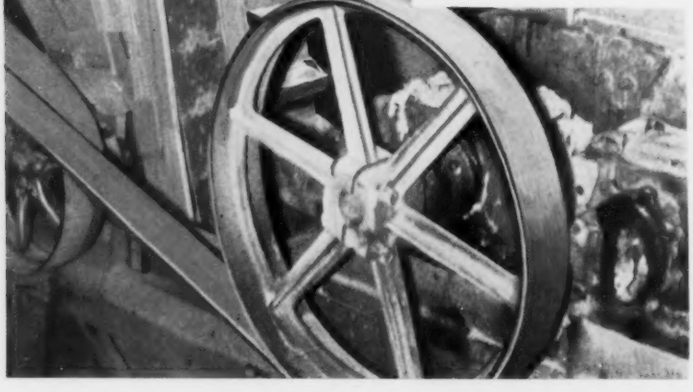
Ruggedly built and efficiently mounted on an air-tired truck body, with a super-power unit and finger-tip control, the MICHIGAN will follow your motor truck anywhere and do anything—loading trucks from stock piles, unloading cars, digging or re-handling material. It is readily convertible—simply by changing the boom—into crane, dragline, clamshell, trench hoe, backfiller or skimmer. The MICHIGAN is the "last word" in truck shovel design, and the *first choice* of progressive operators, who are after greater profits in 1936. *Write for new Michigan folder.*

MICHIGAN POWER SHOVEL COMPANY
BENTON HARBOR, MICH.

YOU CAN ALWAYS RELY ON *Republic* CONVEYOR AND ELEVATOR BELTING

★ Back of these belts is long experience with every type of quarry operations—with every problem of economy in handling aggregates from the rock face or gravel bed to the shipping cars. Republic Conveyor and Elevator Belts have been used by industry for 35 years. They are familiar equipment in America's largest aggregate plants and have made uniformly long, satisfactory service records.

You can absolutely rely on Republic's quality and Republic's recommendations. A factory engineer will gladly consult with you on the solution of any problem that offers possibilities for reduced operating costs.



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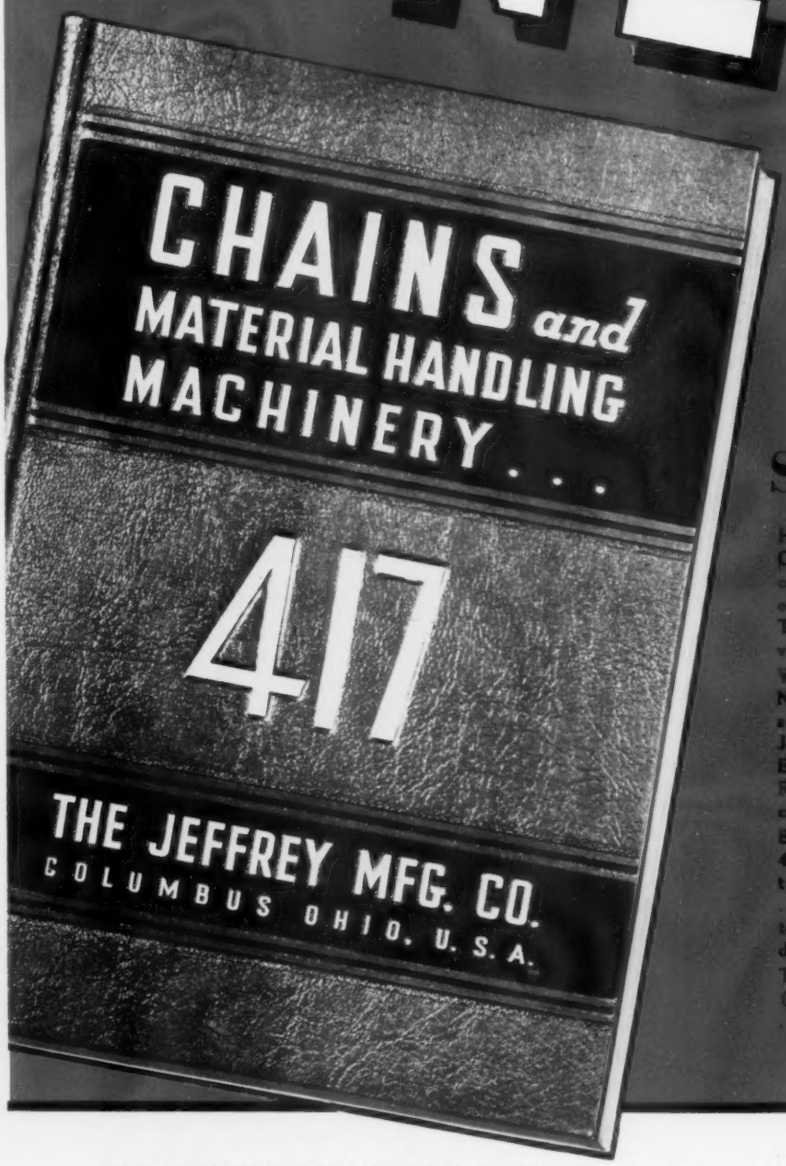

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While it is not a General Catalog . . . this New 400-page book also contains brief descriptions and illustrations of many other Jeffrey Products such as:—Apron Conveyors, Elevators, Belt Conveyors, Feeders, Screens, Reduction Machinery, Hoists, and other miscellaneous items of interest.

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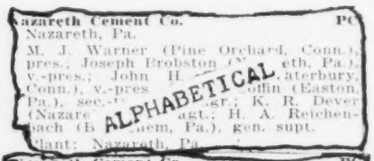
The 1936 Directory section of Pit and Quarry HANDBOOK is the most complete ever published. It is up to the minute—as modern as skill and money can make it. It's checked and double checked.

It gives you the names of the companies, their officers, the number and locations of plants, their capacities and equipment, and the names of the men who buy.

The technical section gives the latest production methods and practices. And there are consolidated catalogs of equipment.

It's Alphabetical

By Company Names →


Nazareth Cement Co. Pe
Nazareth, Pa.
M. J. Warner (Pine Orchard, Conn.) pres.; Joseph Brobston (... eth, Pa.) v.-pres.; John H. ... aterbury, Conn.), v.-pres ... llin (Easton, Pa.), sec.-t... gr.; K. R. Dever (Nazare ... agt.; H. A. Reichenbach (B ... hem, Pa.), gen. supt.
Plant: Nazareth, Pa.
ALPHABETICAL

It's Geographical

By Plant Locations →

Nazareth Cement Co. Pe
Member of Cement Information Bureau; Cement Institute; Portland Cement Assn.
Plant Executives: P... henbach (Bethlehem, Pa.) ... W. F. Kern, chem.; Georg... (Easton, Pa.), sec.-tr., g... specifies equipment.
Products ... Annual Capacity: Portland cement 2,000,000 bbl.
Raw Materials Used: Cement rock, gypsum. Stripping: Marion gasoline shovel. Drilling and Blasting: 3 Sanderson-Cyclone drills. Digging and
GEOGRAPHICAL

A 10% Discount for Cash with Order Before March 1

You'll order the HANDBOOK sometime soon—and you can save 10 per cent by ordering now—with cash. The edition will be ready March 1st—and you'll get one of the first copies received from the binders.

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2-36

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Time has changed the methods of handling material by power excavators and with this change of methods come new and modern shovels, draglines and cranes. A comparison of the machines on the market today will reveal that LIMA engineers have developed a line of shovels, draglines and cranes that are as new and modern as tomorrow. From crawlers to boom point sheave not a single item has been overlooked that will tend to speed up production and give longer, profitable production under all conditions. Their great earning power, low cost of up-keep and their ability to give unsurpassed service in hard digging have gained for them the reputation of being the most modern excavators on the market.

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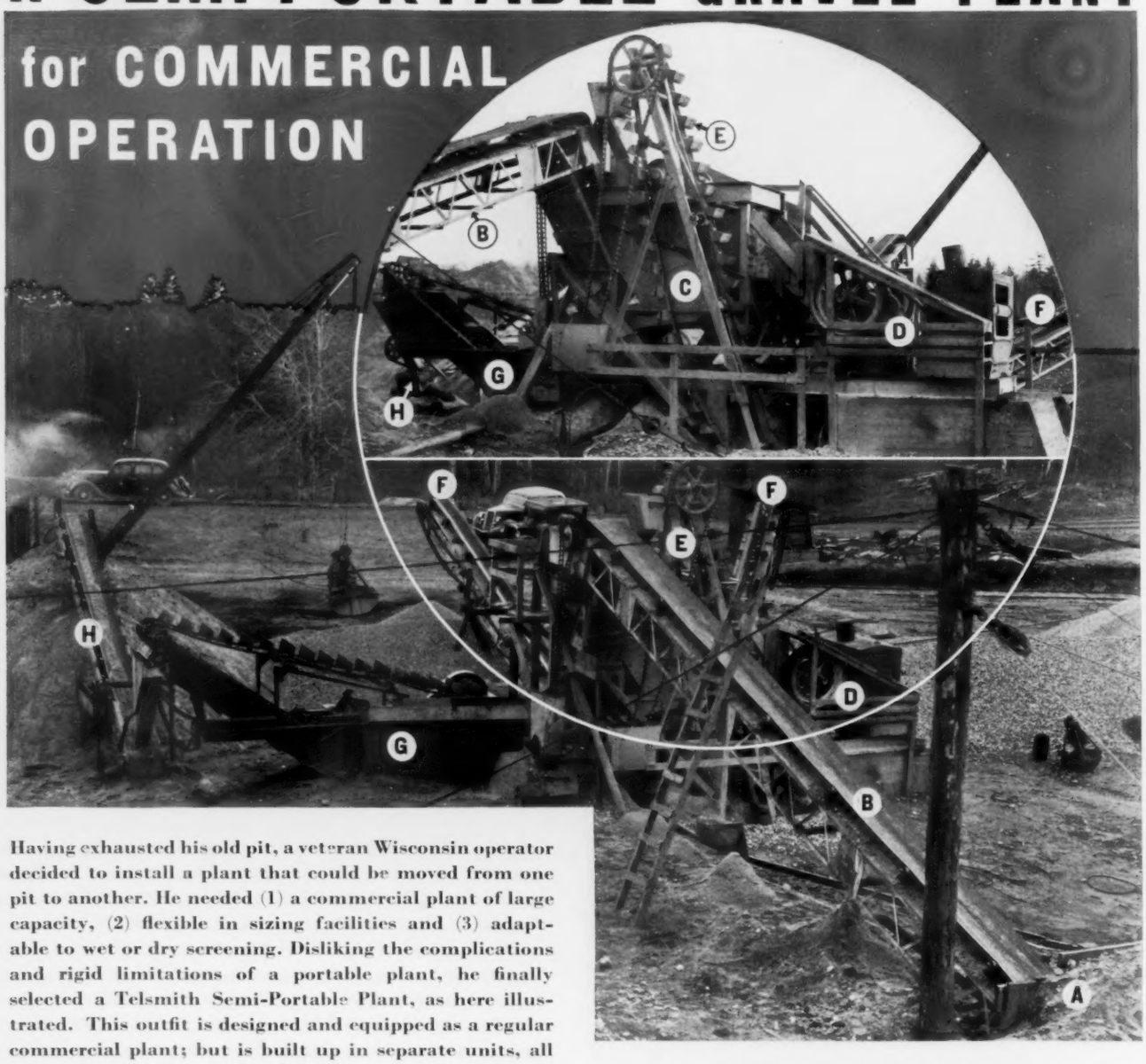
LIMAS ARE BUILT IN CAPACITIES FROM 3/4 TO 3 YARDS

T IN BINDING

A SEMI-PORTABLE GRAVEL PLANT for COMMERCIAL OPERATION



Having exhausted his old pit, a veteran Wisconsin operator decided to install a plant that could be moved from one pit to another. He needed (1) a commercial plant of large capacity, (2) flexible in sizing facilities and (3) adaptable to wet or dry screening. Disliking the complications and rigid limitations of a portable plant, he finally selected a Telsmith Semi-Portable Plant, as here illustrated. This outfit is designed and equipped as a regular commercial plant; but is built up in separate units, all readily movable by truck. No unit weighs over 7 tons. It can be operated as a dry screening plant during cold weather—handles big tonnages—makes three sizes—produces aggregate passing state highway specifications.

Telsmith builds rock crushing and gravel washing plants of all sizes—portable, semi-portable and stationary—varied to suit local conditions. The plant here described is but one example of Telsmith engineering, service and equipment. If interested in semi-portable plants for quarry or gravel plant use, send for Bulletin SG-15, covering semi-portable outfits. Just off the press and chockful of valuable information. No obligation.

A drag scraper brings the pit material to a 20 ft. x 3 ft. 4 in. Telsmith Portable Plate Feeder (A) which delivers to a 20 in. x 42 ft. Telsmith Portable Conveyor (B) discharging on a 3 x 8 Telsmith Triple-Deck Pulsator (C) where the water is added. All oversize goes to a 9 x 30 Telsmith-Wheeling roller bearing Jaw Crusher (D); and, after crushing, is returned to this screen by a Telsmith Chain Elevator (E) with 12 in. buckets. The Pulsator makes two sizes of gravel which are carried to stock piles by two 16 in. x 33 ft. Telsmith Portable Belt Conveyors (F). Water sprays above screen thoroughly rinse the gravel before going to conveyors. Sand passing third deck of screen is flumed to 30 in. x 16 ft. Telsmith Sand Drag (G), which, after scouring and dewatering, discharges to a 16 in. portable conveyor (H) and thence to stock pile. A 65 hp. gas engine with clutch and V-rope drive operates complete plant. Finished products are loaded into railroad cars or trucks by crane with clamshell bucket.

GC1-36

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TELSMITH

VOLUME 28 NUMBER 8

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, FEBRUARY, 1936

Cement Mergers on West Coast Rumored

OPERATIONS FAR BELOW CAPACITY

According to the *Wall Street Journal*, the year 1936 may witness a number of mergers in the Portland-cement industry, particularly on the Pacific Coast. The paper points out that there are at present an even score of cement mills in the three Pacific Coast states, having an annual capacity of roundly 30,000,000 bbl. of cement or a little less than an eighth of the indicated national capacity. Of this capacity nearly 23,000,000 bbl. is in California and the remainder divided between Washington and Oregon.

During 1934 California mills produced about 1.2 per cent. of the national volume of Portland cement, which was the second largest state production exceeded only in Pennsylvania, accounted for about 10.6 per cent. of the mill value of production on 8.7 per cent. of the national mill capacity. While the result looks favorable on a national comparison basis, it must be regarded in light of the generally unfavorable situation.

There has been at least one rather severe price war in California which has affected the southern territory. Only within the last few months has it begun to give place to some measure of stabilization and advancing prices. Indications are that when the year's results are in, the average mill value in California for 1935 will be found to have been appreciably below the $1.48 a bbl. calculated for it by the Bureau of Mines for 1934, or the $1.47 for 1933.

In the Pacific Northwest, where the mill price basis is materially higher than it has been in California, avering $2.10 in 1933 and 1934, it is to be pointed out that the recent biggest government contract, 4,000,000 bbl. for Grand Coulee Dam, was on a mill price of only $1.38, which after discount shrinks to about $1.28. As against this the Boulder Dam cement was largely purchased at around $1.40 f. o. b. mill.

The important thing that appears from the last few years' operations, when record-breaking construction projects were under way using immense quantities of cement for single jobs, is that the demand has failed to raise coast production much above a third of capacity—it reached 37 per cent. in California in 1934, but has been below 32 per cent. this year. Even in the Pacific Northwest the five companies that have Coulee contracts running for about three years could produce the whole amount needed in less than a year of operations if really put to it.

Management and owners realize that the Government contracts can not last forever and that they are, in fact, probably at their climax already. The real need of the mills for profits is a general private construction demand of consequence. While nobody expects a demand that would be likely to work all the mills anywhere near to capacity, there is no early prospect of sufficient business to produce a generally profitable level of operations unless prices are materially bettered. This objective is very unlikely in a heavily supplied and active competitive market.

The thought, therefore, runs toward consolidations that may have the effect of adjusting the competitive side of the business somewhat. It would be in no way surprising, especially in California, if the coming year saw merger negotiations develop.

Gravel Producer Enters Retail Concrete Field

★ Henry E. Strathmann, Philadelphia, Pa., whose sand-and-gravel operations are conducted at Paulsboro, N. J., has entered the pre-mixed concrete business in the Philadelphia area. A complete batching plant is in operation and deliveries are made with a fleet of Blaw-Knox mixer trucks.

Barge Movement of Sand and Gravel Shows Drop

According to estimates of the Army Engineering Corps, river movement of sand and gravel on the rivers of the Pittsburgh district was considerably less in 1935 than in the preceding year. This was due to the curtailed program of road building in that area. Thirteen dredges were operated on the Ohio and Allegheny Rivers during the year. The total movement on the Ohio, Allegheny and Monongahela Rivers was estimated at 2,334,000 tons in 1935. In 1934 a total of 3,070,000 tons was recorded.

Company Using Dust Collectors Wins Suit

JURY DENIES PLAINTIFF DAMAGES

Further indication that the installation of modern dust-collecting equipment kept in efficient working order will reduce to the absolute minimum the possibility of proof of negligence when employees contract silicosis or pneumonoconiosis, is given in a recent trial at Elizabeth, N. J.

The case was one against the United States Metals Refining Co., and an employee of the concern had sued for $100,000 damages, contending that he had contracted pneumoconiosis while working at the plant.

Testimony that the dust-collecting equipment in the plant was modern and efficient and that there had been no hazard was given at the trial by M. A. Eiben, president of the Northern Blower Co, Cleveland, O., and a nationally-recognized expert on air filtration and dust collection.

After a trial lasting three weeks, it took the jury only 30 minutes to deny the plaintiff damages.

Aged Lime-Putty Being Produced by Warner Co.

★ Lime putty is being produced at the Brooks-Taylor plant operated at the Wilmington, Del., yard of the Warner Co. Patents on the plant are held by W. Hayden Brooks of Birmingham, Ala., and the Chicago Bridge & Iron Wks. manufactured the equipment.

The process involves the slaking of quicklime to a milk of lime, filtering off most of the water until the required putty-like consistency is obtained, and aging the product for at least 10 days in air-tight tanks.

Yosemite Is Rebuilding Plant Damaged by Fire

Rebuilding of a portion of the plant of the Yosemite Portland Cement Co., near Merced, Cal., which was damaged to the extent of $65,000 by a fire last November, has begun. New storage silos, office and warehouse are to be erected.

Strong Platform Is Adopted by A.R.B.A.

EQUIPMENT SHOW LARGEST EVER

Adopting a strong platform of purposes and policies governing public-roads management, the American Road Builders' Assn. closed a most successful convention and show at Cleveland, O., Jan. 24. Approximately 75 papers dealing principally with engineering topics were heard at the simultaneous sessions held during the four-day gathering.

Extension of Federal aid to secondary roads and streets, removal of road building as an employment-relief measure using primitive methods and reestablishing it to employ modern construction methods and machinery, and a plea for building safety into the roads were the highlights of the platform adopted.

Among the topics discussed by the speakers at the general technical sessions, and the special group gatherings of county and city officials, and contractors were those dealing with pavement design, soil stabilization, expansion joints, surface improvement and basic planning.

Road-tax diversion, emergency financing and system planning, and Cuban and Mexican highway development were other subjects expounded at the various sessions.

The equipment exhibit was the largest ever. Floor space was occupied by 230 exhibits and covered 2½ acres. The show marked the return of heavy equipment which has been lacking for a few years.

Indiana Operator Opens Third Plant in Illinois

★ The Vincennes Sand & Gravel Co., which has been operating plants at Vincennes, Ind. and Russellville, Ill., is preparing to operate at a third location, near Lawrenceville, Ill. Included in the new equipment purchased is a 3-deck Simplicity vibrating screen and a 6-in. pump.

Rebuild Georgia Ochre Plant Following Blaze

Plans are in progress for the rebuilding of the plant of the Cherokee Ochre Co., at Cartersville, Ga., which was destroyed by fire recently. J. Norris Hall is owner and manager of the operation.

Powdered Quicklime Is Effective Thawing Agent

Pulverized quicklime, according to the National Lime Assn., is reported to be an effective agent for removing snow and ice from pavements and roadways. It should be particularly useful around street car and railroad tracks, especially in the vicinity of frogs, switches, and crossings which must be kept open at all hazards.

Due to its ability to inhibit rust or corrosion in metal, lime should find favor for the use outlined. The heat generated during slaking of the pulverized quicklime is said to be sufficient to remove or melt all ordinary snow and ice. Another advantage of lime for this purpose is that it does not adversely affect vegetation.

Iowa Gravel Firm Buys Portable Washing Plant

★ The Hawarden Gravel Co., Hawarden, Ia., has augmented its producing facilities by purchasing a Universal portable crushing-and-screening plant. The new unit is being used to obtain washed concrete gravel.

New Silica-Sand Plant on Island near Ottawa

C. E. Sayler, formerly identified with the old Commonwealth Silica Co., which operated near Ottawa, Ill., before its consolidation with other companies in that district, is building a silica-sand plant on Bull's Island in the Illinois River, near Ottawa. Mining will be by the hydraulic method and the material is to be crushed, screened and washed. Most of the sand will be shipped by barge to Chicago for transfer to lake steamers, according to Mr. Sayler.

California Plant Adds Cone Crusher, Screens

★ Pacific Coast Aggregates, Inc., have installed a Symons cone crusher at the Eliot, Cal., plant. Screening facilities, too, have been improved through the addition of three Symons screens.

Minnesota Takes Bids on Stabilization Projects

Further steps in getting its low-cost road program under way have been taken by the Minnesota Highway Department during recent weeks, according to releases from the department's news bureau. Included in the projects for which bids have been received, are seven stabilization projects totaling 51.5 miles. This mileage is in addition to 75 miles placed under contract last autumn.

New Portable Plant to Aid Regular Facilities

★ A new portable crushing-and-screening plant, incorporating a Symons vibrating screen, has been placed in operation by the Northwestern Gravel Co., Lake View, Ia.

★ A new talc and soapstone plant has been completed at Chatsworth, Ga., by the Southern Talc Co. Equipment includes Link-Belt conveyors and elevators, Williams hammer- and roller-mills, vibrating screens, etc.

Cement Prices Near Normal at Brooklyn

UP 36 CENTS F.O.B. WATERFRONT

Portland-cement producers have reestablished normal prices on the south water front, Brooklyn, N. Y., by increasing the quotation to dealers to $2.18 per bbl., in paper, f. o. b. cars alongside the dock. Since early last July a "depressed" price of $1.82 per bbl. had been in effect in that territory.

The lower price was put into effect last summer to meet the advancing shipments of foreign cement that were arriving in South Brooklyn and was restricted to deliveries at the dock at that point to dealers in the four counties of Long Island.

The new price, according to producers, may be further adjusted if it fails to meet the requirements of the conditions existing in this particularly competitive locality. It is thought, however, that the recent action of the local authorities in charge of public work construction in discouraging the use of foreign cement will do much to restrict importations.

1936 P.C.A. Ad Program to Stress Safety Theme

National advertising to be undertaken during 1936 by the Portland Cement Assn., will feature concrete highways as a vital factor in safety. Roche-Williams & Cunnyngham, Inc., Chicago advertising agency, is handling the account. The budget for this year's program is approximately 50 per cent. greater than the amount spent last year, according to Edward J. Mehren, association president. Business, farm and general magazines will be used to carry the message to the public, as well as about 3,000 daily and weekly newspapers.

Installs New Shovel in Georgia Cement Quarry

★ A Marion Model 450 shovel of 1¼ cu.yd. dipper capacity has been placed in service at the cement-rock quarry of the Southern States Portland Cement Co., at Rockmart, Ga.

TVA Will Construct Dam near Guntersville, Ala.

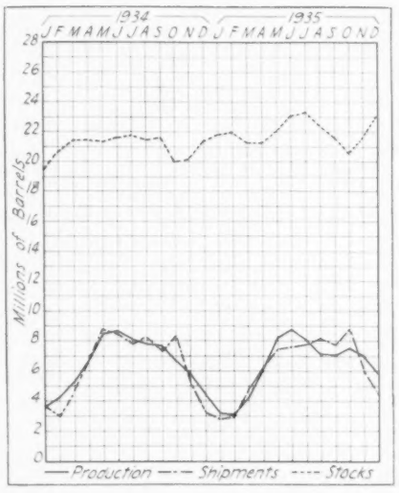
The Tennessee Valley Authority has authorized the construction of a dam on the Tennessee River nine miles downstream from Guntersville, Ala. The dam will cost $29,000,000. This figure does not include a roadway across the top of the dam. Plans do not include any initial power installation.

★ Improvements at the Ingomar, Cal., magnesite plant of the California Chemical Co., recently have included the installation of a Traylor-Cheesman burner on the rotary kiln.

Cement-Mill Activity Reaches 1934 Levels

GAINS RECORDED IN SOME AREAS

Portland-cement production and shipments in 1935 nearly reached the level attained in 1934, according to statistics just released by the Bureau of Mines. Preliminary figures for production show a total of 76,471,000 bbl. in 1935 and shipments of 74,943,000 bbl., decreases of 1.6 and 1.3 per cent. from



Production, shipments and stocks of cement, by months, in 1934 and 1935.

the preceding year, when production was 77,682,000 bbl. and shipments 75,917,000 bbl.

The ratio of production to capacity for the year was 28.6, while in 1934 it was 29.0. This comparison is made on the basis of estimated capacity of 163 plants at the close of December, 1935, and 162 plants at the end of December, 1934.

Slight increases in shipments for the year were noted in Michigan, the Pacific Northwest, and in the South and Southwest. Other areas were about the same or somewhat lower than in 1934.

In December, 1935, production was 5,803,000 bbl., shipments 4,514,000 bbl., and stocks at the end of the month totaled 22,903,000 bbl. For the final month, production and shipments were 23.4 and 45.4 per cent. higher than for December, 1934. Stocks at the mills were 6.8 per cent. higher at the end of 1935 than they were a year previous.

These statistics were compiled from reports received by the Bureau of Mines from all manufacturing plants except one.

Louisville Cement Lets Grinding Mill Contract

★ An addition to the grinding department of the Speed, Ind., plant of the Louisville Cement Co., is to be built shortly, contracts for the new building having been let to the McClintic-Marshall Co., Bethlehem, Pa.

New grinding equipment is to be installed, together with Raymond air-separating equipment.

John C. Best Chosen As Gypsum Assn. President

At the recent annual meeting of the Gypsum Assn., the following officers were elected:

John C. Best, president; L. I. Neale and C. O. Brown, vice-presidents; A. J. Campbell, treasurer; and Henry J. Schweim, secretary.

In addition to the officers, the following will make up the board of directors for 1936: M. H. Baker, A. R. Black, C. O. Brown, T. P. Eldred, S. M. Gloyd, R. B. Henderson, C. F. Henning, S. J. Kelley and James Leenhouts.

National Gypsum Co. to Float New Stock Issue

Financial circles report that the National Gypsum Co. is planning to issue and sell a new convertible preferred stock. The proceeds from the sale of the issue would be used to refund about $2,600,000 of the 7-per cent. preferred now outstanding and callable at 105.

U.S.G. Builds Addition at Port Clinton Plant

★ An addition is being built to the sampling building of the United States Gypsum Co., at Port Clinton, O. When complete, facilities at the sampling department will be more than double those existing at present.

New Types of Roads Given Traffic Trials

CEMENT-SOIL AND SALT EMPLOYED

A new type of cement-soil road is under study in South Carolina. The sandy soil of that state offers a good highway material, it is said, if a suitable binder for the base can be found. Portland cement is declared to be the solution of the problem. It is spread over a sand-clay road and mixed into the soil with scarifiers after which comes a heavy sprinkling of water followed by a thorough packing with rollers. On such a sand-cement base the usual bituminous surface is applied.

Cornell University is at present experimenting with the construction of salt roads. Salt is not used solely as a binding material between the base and top surface, but is mixed into the natural clay of the road and serves to keep it moist. Such a road is to be constructed in Van Zandt County, Texas, near America's largest salt mine, property of the Morton Salt Co., which will furnish the raw material. Sixteen tons of salt to the mile will be mixed with sand and clay and used as a 3-in. top dressing for the road.

Schundler Will Process Feldspar at New Plant

★ Construction started in December on the new feldspar-processing plant of F. E. Schundler & Co., Inc., located near Custer, S. D., and the plant is expected to be completed and operating by April 1. The company owns extensive deposits in that vicinity and has retained H. R. Erich, veteran feldspar operator, to manage the plant. Mr. Erich is also supervising its construction and the installation of the machinery and equipment.

Main offices of F. E. Schundler & Co., Inc., are at Joliet, Ill., where a variety of nonmetallic minerals are processed. Custom grinding is also done. A similar plant is operated at Brooklyn, N. Y.

★ The Consolidated Feldspar Corp., Trenton, N. J., has installed a 20-ft. dust collector, manufactured by the Northern Blower Co., at its plant in Erwin, Tenn.

SUMMARY OF MONTHLY ESTIMATES OF PRODUCTION OF FINISHED PORTLAND CEMENT IN 1935, BY DISTRICTS
(Thousands of bbl.)

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1935	1934
E. Pa., N. J., & Md.	547	535	882	1,415	1,695	1,681	1,468	1,192	1,138	1,417	1,402	791	14,163	14,918
New York & Maine	0	3	141	444	664	587	577	544	592	543	283	193	4,571	5,016
Ohio, W. Pa., & W. Va.	54	61	248	542	783	996	917	817	903	895	685	403	7,304	7,356
Michigan	116	118	112	322	495	551	595	561	536	481	478	266	4,631	4,104
Wis., Ill., Ind., & Ky.	458	421	487	600	974	1,092	656	522	797	825	848	535	8,216	9,079
Va., Tenn., Ala., Ga., Fla., & La.	345	439	589	701	664	953	740	645	667	623	606	679	7,651	7,560
E. Mo., Ia., Minn., & S. D.	467	372	393	368	848	907	905	930	724	612	676	677	7,879	7,786
W. Mo., Nebr., Kan., Okla., & Ark.	295	255	267	430	671	725	687	695	400	516	508	552	6,001	5,838
Texas	294	221	278	347	355	275	470	261	259	283	327	435	3,805	3,538
Colo., Mont., Utah, Wyo., & Idaho	113	77	152	125	269	256	277	201	181	280	243	202	2,376	2,181
California	471	461	634	565	661	563	643	669	729	788	854	936	7,974	8,722
Oregon and Wash.	42	89	115	277	143	139	86	198	247	247	183	134	1,900	1,650
	3,202	3,053	4,298	6,136	8,222	8,725	8,021	7,235	7,173	7,510	7,093	5,803	76,471	77,748

Home Building Ends Year at High Level

VOLUME GREATEST IN FOUR YEARS

Residential building ended the year 1935 with a total greater than for any year since 1931. According to figures of F. W. Dodge Corp. the volume of home-building operations, both new and alteration, totaled $478,843,100 in the 37 eastern states. This represented a gain of 92 per cent. over the total of $248,840,100 reported for 1934. The 1931 total for the 37 eastern states aggregated $811,388,700.

For December, 1935, residential building amounted to $45,140,100. This was more than three times the total of $14,550,500 reported in the 37 states during December, 1934, and compares with only $39,695,200 for November, 1935. "The customary seasonal dip between November and December thus failed to materialize in 1935, indicating the firmness of the recent recovery in residential building operations," is the way the Dodge organization characterizes the December results.

For all classes of construction, the December total in the 37 states amounted to $264,136,500 as against $188,115,000 for November and only $92,684,900 for December, 1934. In the December, 1935, total which incidentally was the highest monthly volume since that reported for July, 1931, besides residential building, were included $124,506,000 for non-residential buildings; $76,386,700 for public works of heavy engineering types; and $18,103,700 for public utilities.

For the full year 1935 construction awards of all descriptions in the 37 eastern states amounted to $1,844,544,900 as against $1,543,108,400, a gain of almost 20 per cent. between the two years. In the 1935 total, besides residential building, were included $675,488,600 for non-residential building; $578,541,800 for heavy public works; and $111,671,400 for public utilities. Comparable figures for 1934 follow: $543,031,800 for non-residential building; $625,044,500 for heavy public works; and $126,192,000, for public utilities. From these comparisons it is thus seen that the entire improvement in 1935 over 1934 was due to gains in residential and non-residential building as distinguished from engineering types which were actually undertaken on a lower scale than in 1934.

Find Portland-Puzzuolan Cement Highly Valuable

Investigations by R. E. Davis, J. W. Kelly, G. E. Troxell and H. E. Davis of the University of California, reported at the 1935 meeting of the American Concrete Institute, make it appear that Portland-puzzuolan cements of proper composition are suitable for hydraulic structures, mass concrete, and structures subjected to the action of aggressive waters. They are suitable for general concrete construction where extreme drying conditions are not encountered; but, because of their relatively high shrinkage, Portland-puzzuolan cements containing a large percentage of puzzuolan are unsuitable for rich mixes in thin sections subjected to prolonged drying.

As compared with the corresponding Portland cements, the relatively high workability, impermeability, and strength of Portland—puzzuolan cements in the leaner mixes make these cements particularly suitable for concretes in which strength is not a primary requirement. In such cases, there appears the possible economic advantage of using less Portland-puzzuolan cement than would be required to secure the same results if a Portland cement were employed.

Of the four types of Portland-cement clinker investigated, Portland-puzzuolan cements manufactured from the clinker of high-lime content appear to give most favorable results so far as strength and volume-constancy are concerned.

Start Generating Power at Cooley Gravel Plant

★ Power is now being generated at the Sampsel, Mo., gravel plant of the Cooley Gravel Co., following the recent installation of equipment. This includes a 330-hp. Nordberg Diesel engine direct-connected to a 225-kw. General Electric generator, and a 200-hp. Fairbanks-Morse semi-Diesel engine direct-connected to a Fairbanks-Morse 136-kw. generator. Frequency is 60 cycles and voltage 440. Complete switchboard equipment with voltage regulators were also installed for control.

Discourages Loose Use of Term "Rock Asphalt"

A campaign is being launched by the recently-formed Kentucky Rock Asphalt Institute to discourage the use of the term "rock asphalt" unless natural rock asphalt is actually meant. According to A. H. Hinkle, executive director of the association, artificial mixtures are not entitled to the use of the words "rock asphalt," even though a modifying term be employed in designating the name of the material.

Installs New Vibrating Sizing Screen, Crusher

★ The Crystal Concrete Corp. of South Braintree, Mass., is equipping its plant with a new No. 19 Kennedy gearless ball-bearing crusher and a Kennedy 3 ft. by 8 ft. vibrating screen. This equipment is being furnished by Kennedy Van Saun Mfg. & Eng. Corp. through the H. R. Jaques Co. at Boston, Mass.

U. S. to Pay $1.79 For Imperial Dam Cement

THREE PRODUCERS SPLIT AWARD

Contracts for supplying 375,000 bbl. of cement for the Imperial dam and desilting works in California have been awarded by Secretary of the Interior Harold W. Ickes to the Riverside Cement Co., the California Portland Cement Co. and the Southwestern Portland Cement Co., all of Los Angeles, on their joint bid of $1.79 a bbl.

The net price was $588,750 f. o. b. the plants at Colton, Crestmore and Victorville, Cal.

The bid offered a refund of 40c. a bbl. for return of sacks making the net cost $1.57 a bbl. The joint bid by the companies was the only one received at the Denver office of the reclamation bureau.

Sec. Ickes rejected the companies' joint bid of $2.22 a bbl. on 40,000 bbl. of sulphate-resistant Portland cement, with a similar sack allowance. PWA engineers said the price was considered high and that this cement would not be needed until next fall. They proposed that the award be deferred.

New Safety Campaign in Lime Industry Is Begun

Rules and enrollment blanks for the National Lime Assn. safety competition for 1936 have been mailed from the Bureau of Mines, and lime operators should send the enrollment blanks directly to that bureau, at Washington, D. C. The period of this contest is for the entire calendar year of 1936. The Bureau of Mines is now checking the accident reports received covering the last half of 1935. The entrants in the 1935 competition have been sent recapitulation forms summarizing the accident data. As soon as these have been finally checked and returned to the Bureau, winners of the 1935 contest will be announced.

Erects 5 New Bins for Raw-Materials Storage

★ Five new storage bins for raw material are being erected at the Gibsonburg, O., lime plant of the National Mortar & Supply Co., of Pittsburgh. Contract for the work was awarded to the James Stewart Corp. of Chicago and 30 workmen are employed on the improvement.

Add New Excavators at Three Gypsum Quarries

★ The National Gypsum Co., which recently absorbed the Universal Gypsum & Lime Co., has installed Lorain shovels in its workings at Luckey, O., Oranda, Va., and Rotan, Tex.

GEORGE BARTLETT OBSERVES TWO GOLDEN ANNIVERSARIES

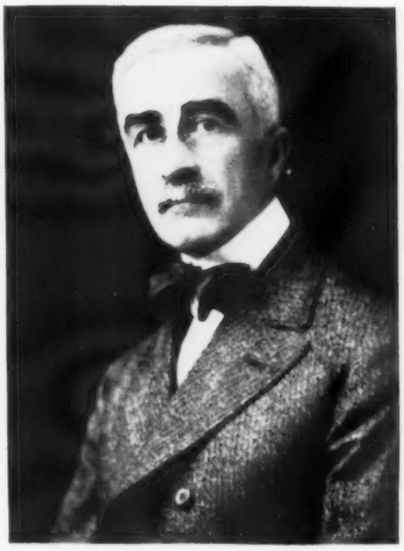
ANOTHER road show has passed into history and the thousands who came to Cleveland are again back home. The road builders are stringing their pipe lines and driving their grade stakes, glad to be busy extending once more the ever-growing mileage of American highways. They picked up a lot of tips and new ideas at the show and convention, renewed acquaintances, had a good time generally.

Perhaps you saw that not-so-tall individual with the don't-give-a-damn strut, cigar at an acute angle, with white hair, bushy black brows and flowing bow tie whom everybody seemed to know and who had a wiser crack in answer to each wise crack? No, he wasn't the "big boss" of the show. That was George S. Bartlett. Almost everybody connected with road building knows George. In fact, the cement people call him the father of the concrete road. He's been connected with the cement industry for a half century and there was a time when he knew all the highway commissioners and almost all the highway engineers of the 48 states. He still knows most of them. And most of them know George.

George will be 78 years old come next April. But he's as spry as the most of us are at 50. If you ask him what keeps him so young he'll probably tell you strong tobacco, stronger liquor and raisin' hell in general.

George doesn't have a "regular" job anymore. He's a sort of traveling ambassador for the Portland Cement Association. One day he's apt to be down in Florida. A week later you'll probably run across him along Broadway, or on Michigan Boulevard, or grabbing a cab bound for the highway commissioner's office out in Sacramento. But wherever and whenever you see him he'll still be the same old George S. Bartlett with the rapid-fire lingo and that magnetic something or other about his personality that you'll never forget.

Back in 1885, in Milwaukee, he joined the old Milwaukee Cement Co. For 20 years he was one of the mainstays of that organization, until Portland cement came into its own. Then he went out to Yankton, S. D., and managed a cement plant from 1905 until 1911, when the high cost of coal forced the company out of existence. In Chicago, one day, he ran across B. F. Affleck, president of the Universal Cement Co. "Know anything," said Mr. Affleck, "about concrete roads?" "Not a danged thing—and neither do you," was George's reply. Next day he grabbed a rattler for Detroit to see the only concrete roads worthy of the name. They looked good to him. A few days later, George had the whole board of supervisors from Milwaukee looking at them too. And it wasn't long before Milwaukee County began repaving the old Janesville Plank Road with concrete!



George S. Bartlett.

Four or five years later, after concrete had proved to be the ideal highway material and miles upon miles of it were being laid in nearly every state, the cement industry decided to do something for George Bartlett in appreciation of his missionary work in establishing the concrete road. They tendered him a banquet one balmy night in May, 1916, and presented him with a chest containing 300 twenty-dollar gold pieces—$6,000.

After that, he worked even harder promoting concrete highways. By 1928, the United States was pretty well sold on Portland-cement concrete thoroughfares and George looked about him for more worlds to conquer. He toured South America and Europe, and when he came home a grateful cement industry threw a party for him on his birthday and made him another swell present—$10,000 in coin of the realm!

Each year since 1931, highway officials have presented a bronze plaque to somebody for outstanding progress in highway construction. It is called the George S. Bartlett Award and serves to keep forever alive with the road builders the memory of a dapper gentleman who has helped them on their way to success.

Just last month—Sunday, January 26, to be exact—Mr. and Mrs. Bartlett celebrated their golden wedding anniversary at their home up north of Chicago. George arrived home from the road show just in time to be with his help-mate to do honor to the event.

Congratulations, George S. Bartlett, on this happy occasion. And our congratulations, too, on your half-century of service to the cement and road-building industries. May your splendid influence continue to be felt as, year after year, the ribbons of concrete continue to unreel over this broad land.

Southern Rock Asphalt to Develop New Deposit

The Southern Rock Asphalt Co., Oklahoma City, Okla., is preparing to develop a new deposit at Prairie Valley, near Ardmore, Okla. At present, the company's mines and processing equipment are confined to its holdings near Dougherty, Okla. R. D. Farmer is general manager while M. L. Curry is superintendent.

New Truck Mixers Placed in Service at San Pedro

★ Two Jaeger truck mixers were placed in service a short time ago at San Pedro, Cal., by Sidebotham & Co. The trucks were purchased through Smith-Booth-Usher Co., at Los Angeles.

Ground Feldspar Prices Reflect Increased Costs

According to one operator, the cost of mining and grinding feldspar advanced sharply during the past 18 months, and the higher costs are reflected in selling prices. The price of feldspar for the glass trade advanced $1 a ton during 1935. It is expected that shipments in 1935 will exceed those of 1934 by about 30 per cent., in both tonnage and value, and a further increase of about 10 per cent. is anticipated for 1936.

Topeka Producers Form Group to Promote Sales

Producers of sand, gravel and crushed stone in Topeka and vicinity on January 23 completed organization of the Aggregate Sales Exchange, Topeka, Kan., a sales group formed in order better to serve contractors on large projects. This combination of producers assures a supply of any quantity of any desired material regardless of flood or other conditions at any one plant. It has already had some effect in stabilizing market conditions and has ended a price war of a month's duration. Otto Kuehne, Jr., Kansas Sand Co. and Paul Sherman, Sherman Stone Co., are sales representatives. F. M. Horn is secretary of the exchange with offices at 417 E. 13th St., Topeka.

★ The Hersey Gravel Co., road builder and aggregates producer, has added to its excavating equipment by purchasing a new Lorain shovel.

. . . Editorials . . . . . .

The Will of the People

IT is amusing, if not instructive, to observe the dexterity with which those who would influence what they call public opinion make use of such popular concepts as "liberty," "freedom of speech," "freedom of the press," and, perhaps the most appealing of all, the "will of the people." It is one of the tricks of the demagogue, be he political, commercial, editorial or professorial, to seize upon some pretty turn of speech, build around it a wholly fallacious structure of seemingly related and allegedly logical ideas, and count upon the gullibility and wishful thinking of the multitude for its acceptance. And when he is criticized for his inconsistency or lack of reason, he calls upon the shibboleths of his own creation to rally to his defense. He seeks to prove his case by submitting as evidence the very point at issue. So we must not be astonished if we see these popular fictions brought into the public forum, where they are made to serve either alternately or simultaneously the cause of "*pro*" and that of "*contra*."

The "will of the people" is doing double service these days in the controversy concerning the usefulness of the supreme court, the legislature, the president, and the constitution itself. The question of how each one of these is related to the other, how each seeks to encroach upon the other—the first three through the efforts of living men, the last through the paralyzing influence of the "dead hand"—how each sets limits upon the action of the other, is being answered too often by reliance on the alleged "will of the people." Thus, those who believe that the acts of Congress, which is supposed to express the "will of the people" of 1936, should be subject to the nullifying decisions of a supreme court set up by a constitution which is likewise assumed to represent the "will of the people" (but this time of 1787), prate loudly of the danger of doing violence to the same intangible "will of the people." Those who argue the contrary point of view call heaven to witness that their sole desire is to give practical expression to this same "will of the people." Donald Richberg, for example, who talks about "efforts to thwart the public will through stretching the judicial power to nullify legislative acts" when arguing for limiting the supreme court's power, is satisfied with the same quality of supporting evidence as the editor of the *Wall Street Journal*, who stated not long ago that "the public will is that there be limitations on the federal power and that no change be made in the Constitution except by the process provided therein . . ." and that ". . . the courts respect the popular will by respecting the Constitution, which is its expression." Both are guilty of making rash assumptions when they take for granted the existence of a "will of the people" and both are guilty of conceit when they pretend that they understand and are qualified to interpret that "will," even if its alleged reality could be proved. The trouble arises from overzealousness to prove a point and a deficiency of pertinent and convincing evidence.

If the "will of the people" could be shown to be more than a figment of the imagination, we should still be faced with the dilemma of proving a number of equally difficult questions. First, there is the question whether the Constitution ever expressed—either in its original form or in its amended state—the "will of the people." The accepted original draft obviously did not represent the will of its fifty-five signers, since most of them were forced to make concessions, some even to reverse their votes, in order to achieve the adoption of some type of document. To assume that such a compromise result could express the will of the three millions of people who then inhabited the United States is to cast all faith in the law of probabilities to the winds.

Secondly, there is the question whether any legislature, federal or state, ever expressed the "will of the people" in any of its enactments, since it had no means of ascertaining what that will may have been or when it changed—as it doubtless often did change—from what it was to what it became. The Constitution provides no machinery for studying that will, recording its expressions and changes, or of regulating legislative action in accordance with its whims and fancies. The probabilities are overwhelmingly against the supposition that legislators do, or even can, represent the "will of the people."

Thirdly, assuming without any sound reason that the Constitution, did and that legislators do, express the "will of the people," there is still no warrant for assuming further that the "will of the people" of 1787 coincides in any particular with the "will of the people" of 1936. Since the "public will," if there really be such a thing susceptible of precise definition and appraisal at any given moment of time, must be as much a product of changing circumstances, as much influenced by education and the spread of knowledge, as are any other phenomena of the human mind, one oversteps the bounds of logic when he assumes that it can remain fixed, that it is not in fact constantly undergoing change. And if it is in a state of flux and, so, defies the efforts of those who would define it, limit it and measure it, how can anything of a more or less permanent nature—such as a constitution hard to amend and legislative inertia hard to overcome—be expected to reflect it in any form worthy of the term "expression"?

And if representatives elected by the people can not, in the very nature of things, express in their actions the "will of the people," how can a court, whose members are appointed by the President, without the consent of the people, be assumed to have a capacity for considering the wishes of a

people of whose opinions they are not required to take notice? Also, the advocates of restrictions on the power of the supreme court will ask, how can the constantly-changing "will of the people," as it is supposed to be expressed through legislative action, ever find true expression, if laws are always to be either approved or nullified according to whether they conform to or depart from the principles laid down in a constitution which, inasmuch as it did not at the time of its adoption express the "public will" of its era, can not now conceivably express that of the present age?

We shall not get very far, we fear, in our attempts to solve the problems that beset us, if we continue to rely on that will o' the wisp, the "will of the people." Its very elusiveness makes it a popular weapon both in attack and defense, since its lack of definite form enables unscrupulous persons to make it appear in whatever shape they wish it to take. The flexibility which makes its use convenient also makes its use reprehensible, for anything that can be so easily bent is certain to be bent and to whatever purposes those who utilize it may deem worthy.

The difficulty—we should be inclined to say, the impossibility—of ascertaining the nature and extent of the "popular will" is the chief defect in the theory that representative government is synonymous with true democracy. It may also be an important contributing factor in the recent rise of dictatorships, in which the will of an individual supplants by symbolization the concept of the "will of the people" and in which there is no pretense of trying to ascertain what that will may be in order to give it expression. The "will of the people" has long been a cherished ideal largely because every man was believed to be the best judge of what was good for him. Although we no longer believe in the reason, we continue to hug the old illusion, as in so many other cases of custom survival.

We hope to see a lessening in the use of the "will of the people" as an excuse for the perpetuation of outmoded thoughts and institutions, just as we deplore its use to build up national confidence in proposals that are very likely to prove illusory. No one knows what the "will of the people" is or may be on any subject or at any time. At best it is usually what a speaker or writer believes it to be, or, more often, what he would like to have it be. In neither case can it be accepted by thoughtful people as a guide to proper action or as a test of legislative or constitutional fitness.

Silicosis Is Still a Problem

THE small amount of discussion given to the subject of silicosis at the St. Louis aggregates conventions, if it may be taken as a measure of the interest in the subject on the part of producers, is discouraging. Except for a brief reference to the topic by Daniel Harrington, chief of the Health and Safety Branch of the Bureau of Mines, and H. V. Owens, New York Stone and gravel producer, it might have gone unmentioned.

Mr. Harrington tried to leave with his hearers the conviction that silicosis is a real disease and that the unchecked creation of any kind of dust in producing plants sets up a genuine industrial health hazard. He obviously agrees with our opinion which holds that it is unwise and unsafe for employers to dismiss silicosis, pneumonoconiosis and other respiratory diseases with a carefree toss of the hand for no better reason than the fact that some unscrupulous lawyers have defended and even fostered spurious claims for damage to health allegedly due to employment in dust-laden air.

Some notion of the penalties that may be levied for treating the subject with indifference can be gleaned from Mr. Owens' statement that his company was ordered, as the result of the passage of New York's occupational-disease compensation law, to make plant-equipment changes costing $9,000.

ANNOUNCEMENT

THE traditional method of publishing business and other monthly magazines on or about the first day of the month has imposed an unnecessary burden on those whose interests require them to be well informed on current developments in their industries. It has concentrated the dissemination of news and other useful information within a very short period of each month, demanding of readers either a very careful reading of several magazines at a time when duties of greater importance call for their attention or the adoption of some systematic schedule of deferred reading. Under the pressure of their regular business responsibilities the first plan is not likely to be followed, hence much important information that should be read as soon as made available is acquired too late to be of greatest usefulness or is, perhaps, never seen.

This difficulty is especially serious where an industry supports two or more magazines which appear at the same or about the same time. Such a situation defeats the primary purpose of business-paper publishing, which is the provision of valuable information in a form *and at a time* that will facilitate and encourage the reading of it. In order to effectuate this purpose in the industry we serve the scheduled publication date of PIT AND QUARRY has been changed and, beginning with this issue, that date will be the tenth, instead of the first, day of the month. As a result of this action the executive who reads other magazines as well as this one will find that he has more time in which to study each and, in the case of the papers devoted to serving our industries, will receive his year's allotment of news and other information in twenty-four easily assimilable instalments rather than in twelve of a size that makes immediate reading almost impossible.

EQUIPMENT EXHIBITS AT ST. LOUIS CONVENTIONS

Fairbanks, Morse & Company — *Chicago, Ill.*
Thew Shovel Company — *Lorain, O.*
Jeffrey Manufacturing Company — *Columbus, O.*
Kennedy-Van Saun Mfg. & Eng. Corporation — *New York, N. Y.*
Hardinge Company — *York, Pa.*

Cross Engineering Company — *Carbondale, Pa.*
Self-Vulcanizing Rubber Company — *Chicago, Ill.*
Productive Equipment Corporation — *Chicago, Ill.*
General Electric Company — *Schenectady, N. Y.*
American Sealdrok, Incorporated — *Chicago, Ill.*

E. I. du Pont de Nemours & Company — *Wilmington, Dela.*
Link-Belt Company — *Chicago, Ill.*
Chain Belt Company — *Milwaukee, Wis.*
Williams Patent Crusher & Pulverizer Company — *St. Louis, Mo.*
Koehring Company — *Milwaukee, Wis.*

H. E. Rodes, Nashville, Tenn., elected president of the National Crushed Stone Assn.

CRUSHED-STONE PRODUCERS SEE MORE DEMAND FOR AGGREGATES IN 1936

THE crushed-stone industry did not fare as well in 1935 as the outlook in 1934 had seemed to promise. Reports from producers in various parts of the country, presented at the 19th annual convention of the National Crushed Stone Assn. at St. Louis in the last week of January, indicated a general decline in output, as compared with 1934 production, but the prospects for a rising demand in 1936 appear better than a year ago. This situation seemed to quicken the interest of the 97 visiting producers in the future of the association and in the necessity for enlarging its engineering-department activities in behalf of the industry.

At the opening session of the association's convention President Russell Rarey reviewed briefly the work of that body during 1935, particularly as shown by the reports of Messrs. Boyd and Goldbeck dealing respectively with *An Analysis of Association Affairs* and *A Decade with the Bureau of Engineering.*

Mr. Rarey mentioned the growth of sentiment favoring a merger of the aggregates associations and said the desirability of such a change was still an open question in some minds. He reminded his hearers that former President Worthen had said two years ago that a merger was not only logical but practical. Following the invalidation of all N.R.A. codes last year, the subject had been discussed again because of the desire to create some body that could deal effectively with common problems. Opinion had not been sufficiently crystallized, however, to approve the merger idea, so the Mineral Aggregates Institute had been formed in the hope that it might be of service in preserving some of the gains of coöperative action which had resulted from work under Code 109. In his judgment, he said, the institute is of insufficient value to warrant its continuance as now constituted and should either be given more power or resolved into a conference committee.

Reports on business conditions and the outlook for 1936 were presented for seven of the eight regions into which the association has divided the country. This represents a departure from the customary method of reporting in that formerly reports were presented by each of the association's numerous producer directors.

Referring to conditions in Canada, C. M. Doolittle, president, Canada Crushed Stone Co., Hamilton, Ont., said that the output of crushed stone had fallen 30 per cent. in 1935, and that it represented about 25 per cent. of the available production capacity. The new business came principally from the highways and railways. The price level had remained fairly stable, while a tendency to move upward is noticeable. The use of independently operated portable plants has reached its peak and permanent-plant owners have shown no disposition to use equipment of the portable type. Highways need widening and road work will be exended in other directions.

In the Eastern Region, according to A. S. Lane, treasurer, John S. Lane & Son, Inc., Meriden, Conn., the 1935 stone business was 15 per cent. smaller than that of 1934 and prices were 5 per cent. lower due to orders which had been taken at pre-code prices. The year's output was about 25 per cent. of the territory's 1928-1931 average annual capacity. Of the 1935 tonnage, 75 per cent. went for road work, 10 per cent. for building construction and 10 per cent. to the railways. The 1936 outlook is uncertain, but business may increase 25 per cent. without price changes. The demand for building and ballast stone is expected to be better. Considerable business was lost to government producing agencies, but portable plants have not been a serious factor. Producers seem to be against a revival of the N.I.R.A. and do not favor a voluntary code. They believe in open prices such as were made effective under N.R.A. Code 109. No one favors a cost-plus-10 per cent. arrangement.

Business in the Southern Region was smaller in 1935 than in 1934 and prices were higher, reported T. I. Weston, president, Weston & Brooker Co., Columbia, S. C. In his home state the tonnage had fallen but prices had remained firm; the 1936 business he expects to be smaller. In Georgia there was little change in tonnage, but prices declined, and similar conditions prevailed in Tennessee. He believes that the stone business would be much better if government competition could be eliminated.

An improvement of from 20 to 70 per cent. in the stone business in the Northern Region was reported by W. R. Sanborn, president, Lehigh Stone Co., Kankakee, Ill. Prices were from a little to 25 per cent. lower than in 1934. From 60 to 80 per cent. of the tonnage was used in highway work. Government production offered serious competition, and the output of portable plants increased. He reported that there is no tendency toward the operation of portable plants by permanent-plant owners. Producers in his region do not favor a voluntary code.

J. A. Rigg, general manager, Acme Limestone Co., Ft. Spring, W. Va., reported for the Central Region a decline of 15 to 25 per cent. in crushed-stone output in 1935, so that the industry operated at about 30 per cent. of its capacity. The price structure was not destroyed by the disappearance of the N.R.A. code. Of the 1935 business, 60 per cent. came from highway departments, 20 per cent. from the railways and 10 per cent. from general construction. The demand for stone should be better in 1936 and prices can be maintained. Business has not been hurt by government competition but portable plants have proved to be bothersome because of cut prices. More rigid specifications and better salesmanship seem to offer the answer to the latter type of competition. The value of a properly prepared product must be proved. Producers are opposed to a renewal of the N.I.R.A. and to a voluntary code.

Crushed-stone output in the Southwestern Region was near the 1934 level, although the production of permanent plants dropped about 10 per cent., according to E. Eikel, general manager, Servtex Materials Co., New Braunfels, Tex. Highways took 70 per cent. of the output, the railroads 15 per cent., and building construction 2 per cent. The invalidation of Code 109 is partly responsible for the 12-per cent. decline in prices which occurred. The output of commercial stone might have been twice what it was had there been no government and portable-plant competition. Portable plants are furnishing 25 per cent. of the total tonnage. The demand for stone in 1936 should be better than in 1935 and prices not so firm.

For the Northwestern Region Porter W. Yett, president, City Motor Trucking Co., Portland, Ore., reported a 10-per cent. decline in stone production and a downward trend in prices. Seventy per cent. of the output was used in highway construction, 20 per cent. for jetty and rip-rap work and 5 per cent. for building. Government competition has decreased. There is an increasing tendency toward the operation of portable plants by permanent-plant owners. Producers would welcome the return of the N.R.A. and believe that a voluntary code would be of little value except in metropolitan areas.

H. Herbert Hughes of the United States Bureau of Mines volunteered the information that stone production in the first three quarters of 1935 was 14 per cent. lower than in the same period of 1934.

In a lengthy paper, *A Decade with the Bureau of Engineering*, A. T. Goldbeck, director of the association's Bureau of Engineering, reviewed the work of his department since its foundation in 1925 to solve the stone industry's technical and competitive problems. He discussed the development of the beam test and the use of the circular track in many investigations of highway materials. He presented the results of a study of stone and gravel concretes with reference to transverse and longitudinal cracking and illustrated them with lantern slides. He reported on other tests of competitive materials and emphasized the necessity of remembering that the results should not be taken as applicable to all varieties of the materials studied. In speaking of stabilized roads he mentioned their chief advantage as low cost and low transportation cost, and called attention to the importance of producing non-local material at prices that will make competition with local materials possible.

In commenting on Mr. Goldbeck's report, Wilson P. Foss, Jr., New York Trap Rock Corp., New York, N. Y., urged that the association adopt a militant attitude in its advocacy of stone before highway officials. He said that Mr. Goldbeck's findings are of no value unless utilized for promotional purposes.

Speaking on *Industry's Opportunity to Aid Recovery* at the greeting luncheon at noon of the opening day of the convention, Attorney Harold Williams, Boston, Mass., declared that building by private industry would soon outstrip "ponderous government subsidies in the form of public works."

Attorney Williams, who serves as general counsel to the crushed-stone organization, traced the development of the stabilization of the industry through the codes adopted during the life of the N.R.A. He predicted that the unification which resulted from these efforts had not been lost when the N.R.A. was declared inoperative; rather, it taught the industry to work together for a common aim. Every indication points to the fact that the turn toward recovery has definitely been made, he assured his listeners, and with $400,000,000 in gov-

NATIONAL CRUSHED STONE ASSOCIATION

1936

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Nashville, Tenn.

J. R. Boyd, *Secretary-Administrative Director*
Washington, D. C.

W. E. Hilliard, *Treasurer*
New Haven, Conn.

A. T. Goldbeck, *Engineering Director*
Washington, D. C.

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E. Eikel, (Southwestern)
A. S. Lane, (Eastern)
J. A. Rigg, (Central)
N. E. Kelb, (Northern)
T. I. Weston, (Southern)
A. J. Wilson, (Western)
Porter W. Yett, (Northwestern)

ernment funds available for road building this year, a definite housing shortage existing in nearly every community which must be remedied, prospects for a sharp upturn in the demand for aggregates is certain.

"I venture to predict that the volume of business done by this industry in 1936 will be nothing short of surprising when the year ends," he said. "The necessity for coöperative action within this group is, therefore, urgent and must be faithfully undertaken if we are to gain full benefit of the upswing."'

Serving as chairman at the greeting luncheon was E. J. Krause, who introduced a fellow St. Louisian, Col. E. J. McMahon, who extended the official welcome to the city in the unavoidable absence of its mayor. Col. McMahon was no stranger to his listeners, having served as executive secretary of the St. Louis Quarrymen's Assn. for many years. At present he holds the office of commissioner of public works.

The Monday afternoon session was presided over by Stirling Tomkins, New York Trap Rock Corp., New York, N. Y. The first speaker on the program, Frank Sheets, consulting engineer, Portland Cement Assn., and former chief engineer of the Illinois State Highway Dept., was not able to attend the convention. An associate, M. D. Caton, read the paper, which was mainly a technical discussion of modern concrete-pavement design. In this paper the author discussed the trend in highway practice to the point where it is now necessary to make exhaustive surveys to determine which roads should first be improved. The determination of the main roads to be surfaced with high types of pavement and the secondary and lesser roads to be improved with lower grade pavement also requires careful study. Mr. Sheets referred to the pamphlet *Concrete Road Design Simplified and Correlated with Traffic* which can be obtained from the P. C. A.

The more technical part of this paper described tests to determine the width and type of road required, formulas for concrete-slab design, safety factors, etc. An interesting fact brought out by Mr. Sheets was that 97 per cent. of the trucks produced in the last seven years have been of less than 3½-ton capacity, indicating a trend away from heavy units. It was also stated that 97 per cent. of all trucks produced have pneumatic tires.

In *An Analysis of Association Affairs* J. R. Boyd, secretary, National Crushed Stone Assn., reviewed the history and growth of the association. The organization was formed February 7, 1918, at a meeting held at the LaSalle Hotel, Chicago, Ill., which was attended by about 50 crushed-stone producers. By 1924, said Mr. Boyd, the association was functioning smoothly and in 1925 the Bureau of Engineering was established. In the same year the headquarters of the association were moved from Columbus, O., to Washington, D. C., and a full-time paid secretary was employed. Monthly publication of *The Crushed Stone Journal* was also inaugurated.

The need for a research organization in order to take full advantage of Mr. Goldbeck's wide experience resulted in the establishment of a laboratory in 1928. The importance of the engineering division to the producer in solving his problems and in representing the crushed-stone industry before various governmental and trade bodies was so highly regarded that its activities were only slightly curtailed during the depression.

In commenting on the condition of the crushed-stone industry Mr. Boyd said that the low point was reached in 1933, when the value of production was approximately $39,000,000. In 1934 it advanced to $56,500,000. A further rise in 1935, which might normally have been expected, did not materialize, said Mr. Boyd, but in 1936 a very definite increase should develop. The expected rise for 1935, he said, was unquestionably deferred because of the delay by the Federal government in writing the rules and regulations pertaining to the use of public-works funds in the construction of highways.

In conclusion Mr. Boyd discussed the value of the research and promotional work done by the association and the necessity for continuing this work on at least as large a scale as in the past. Among those who arose to endorse continuance of this policy were J. A. Rigg, Acme Limestone Co., Ft. Spring, W. Va., and Wilson P. Foss, Jr., New York Trap Rock Corp., New York, N. Y. T. I. Weston, Weston & Brooker Co., Columbia, S. C., suggested that the association be made even more valuable to the industry in general by expanding its membership.

FURTHERANCE of the road-building program occupied the attention of crushed-stone producers at the Tuesday morning session. Three authorities, speaking for three different materials, contributed to an interesting symposium on stabilized roads.

B. C. Tiney, chief engineer, Calcium Chloride Assn., Detroit, Mich., described the use of calcium chloride in producing stabilized mixtures with aggregates, sand and clay. He pointed out the advantages of plant-mixed materials to the aggregate producer as a means of utilizing waste material at a profit, and described the essential features of a typical plant to produce the mixture. Slides were flashed on a screen to show views in two plants now operating in Michigan.

The use of common salt (sodium chloride) in stabilization was described in a paper read by Dr. C. D. Looker, director of research, International Salt Co., Ithaca, N. Y. He explained the increased ability of a soil-clay road to become more dense and compact under traffic when moistened with a salt solution. Tests indicate little difference in results whether the salt is added dry or as brine, and both plant-mixing and surface application have been tried with excellent results, he said. Most of this preliminary work with salt has been done in Indiana, according to Dr. Looker, and the generally satisfactory results indicate an increased use on secondary and farm-to-market roads in the future.

After experimenting with bitumens applied to the surface of gravel and stone roads, the state of Missouri found out that the bituminous material would do more good in the base course, F. V.

Reagals, engineer of materials, Missouri Highway Dept., declared. As a result, the state has been concentrating on the stabilization of the bases with bitumens and other materials. "Save the Surface" may be a good paint slogan but just the opposite has proved true on Missouri roads. Old bases are scarified and impregnated with bitumens. The material has a tendency to diffuse upward through the mass, forming a durable and strong bearing slab. The cost, Mr. Reagels said, has averaged about $2,500 per mi. and the method requires only a light armor-coat surface. The method has been found to be especially valuable where aggregates are scarce and expensive, he reported, but where cheap aggregates are available, the calcium-chloride method is generally better for stabilization.

In discussing the general subject of stabilization, Mr. Goldbeck pointed out that too much moist clay in the stabilized material may act as a lubricant rather than as a binder and urged the use of a maximum amount of coarse aggregate and less of the binding medium. He cited experience with the sand-clay roads of South Carolina to prove his point.

H. S. Fairbank, chief of the information division, U. S. Bureau of Public Roads, described the extensive survey of rural roads about to be attempted by his bureau. Every road, with its type of surface. will be mapped, and traffic studies will be made to determine where improvements are most needed. Work has already been started in eight states in the East, and the speaker is now *en route* to the South and Southwest to launch the work there.

At the final session on Thursday morning Daniel Harrington, chief, Health and Safety Branch of the Bureau of Mines, presented the awards given to winners of the association safety contest. The first-prize plaque was presented to the Inland Lime & Stone Co. for operating its quarry at Manistique, Mich., the greatest number of man-hours without a single lost-time accident. In 1931 the company's workmen lost $45,000 in wages due to accidents. A safety campaign was inaugurated and as a result the company achieved perfect no-accident records in 1933 and 1934. The Akron, N. Y., plant of the General Crushed Stone Co., one of 19 recipients of certificates for no-accident operation, had an accident-free record covering 42 consecutive months.

Following his remarks on the need for training in accident prevention, he spoke of silicosis and other respiratory diseases. He declared that the breathing of any kind of dust over any considerable length of time is unhealthful. He stated that silicosis is a real disease and that it should not be considered lightly simply because unscrupulous lawyers have been able to collect damages on false claims. "If I were operating a plant, either above or under ground," he added, "I would do everything in my power to prevent the creation of dust." This statement, he said, was based on twenty years' close study of dust diseases, including silicosis and other varieties.

T. C. Powers, assistant to the director of research of the Portland Cement Assn., spoke at length on the *Advantages of Large Size Aggregate for Mass Concrete*. He mentioned the building of the Panama Canal 27 years ago as the first recorded example of the use of large aggregate. Owing to the failure of the secondary crushers, it was decided to use the product of the primary machines, material 8 in. in size. The concrete in which this was used was flattened to a thickness of 10 in. and was found as satisfactory as that using 3-in. material. Prior to the construction of Boulder Dam 5½ million cu.yd. of large-size aggregate had been used. Important among recent projects is Grand Coulee Dam which used 11 million cu.yd. of such material.

He enumerated the advantages of "cobble" aggregate—that larger than 2 in.—as greater weight, lower cost and the ability to obtain by its use any desired degree of strength, water-tightness and resistance to weather. He pointed out that the wider use of large-size material would help the aggregate business because more aggregate is needed in proportion to cement when the larger sizes are employed.

The Resolutions Committee offered and the convention adopted several resolutions: one on the death of W. L. Sporborg, member of the board of the General Crushed Stone Co. and one of the founders of the National Crushed Stone Assn.; another instructing the directors to enlarge the work of the Bureau of Engineering to adjust membership dues to make this possible; and a third praising Secretary J. R. Boyd for his review of association affairs mentioned above.

The convention adopted proposed changes in the association's constitution and by-laws designed to alter the plan of administrative control. Under the revised plan of operations the president will be relieved of all administrative duties but will remain head of the board of directors, will preside at all board meetings and will accept such other duties as the board may give him. Administrative control of the association, subject to the approval of the board, will be vested in an administrative director who will be charged with the responsibility of increasing membership and raising funds. The director of the Bureau of Engineering will be known as the engineering director and will be expected to provide the administrative director with sales material, in the form of engineering and research accomplishments, that will assist in increasing membership. The engineering director will retain all his former authority over engineering and research. Both directors will report to the board, which will appoint them. The secretary and treasurer will have such duties as the board may fix. The executive committee will be elected by the board.

Henry M. Rodes, president, Franklin Limestone Co., Nashville, Tenn., was elected president of the association. J. R. Boyd, formerly secretary, has been made administrative director and A. T. Goldbeck, formerly director of the Bureau of Engineering, has been made engineering director. N. E. Kelb, general manager, Erie Stone Co., Indianapolis, Ind., replaces W. R. Sanborn as vice-president of the Northern Region; otherwise the former vice-presidents remain unchanged.

GRAVEL OPERATORS ENTHUSIASTIC OVER 1935 SALES AND PRESENT OUTLOOK

AN outstanding feature of the twentieth annual convention of the National Sand & Gravel Assn., held at St. Louis, January 28 and 30, was the reports of association directors on business conditions in their districts. These gave every reason for satisfaction with last year's developments and for a hopeful outlook in 1936. As shown in greater detail elsewhere in this article, improvement in the industry has been not only general but considerable, due to an increased demand for its product in competition with other materials.

H. V. Owens, president of the association, presided at the first session on Tuesday morning and briefly reviewed conditions in the industry and the work of the association during the past year. In commenting on freight rates he predicted control of truck rates as a possibility in the near future. He then reviewed the work of the association during the year and the benefits derived by sand-and-gravel producers from its activities. He mentioned particularly the work of the engineering and research division in connection with the revision of the Ohio state highway specifications and the revision of specifications of the Chicago Sanitary District which had excluded local producers. In closing he commented on the growing use of sand and gravel for ballast and bituminized aggregates.

V. P. Ahearn, executive secretary, in his annual report briefly reviewed the history of the association from the time of its founding in 1916. As an example of the work done by the organization in helping to obtain fair freight rates he mentioned the case of I. C. C. Ex Parte 103 which authorized carriers to impose a surcharge of 6c. per ton on aggregate shipments above the prevailing rates. The association, he said, represented the producers at a hearing of Ex Parte 115 at which this surcharge was protested as damaging to the producers and to the railroads in that it encouraged truck shipments and the establishment of portable plants. The average producer, said Mr. Ahearn, showed little interest in a matter which was of vital importance to the future of the sand-and-gravel industry in spite of past strangulation of business by increasing freight rates.

Alexander Foster, Jr., of Philadelphia, Pa., chosen president of National Sand & Gravel Assn.

In commenting on the reasons for the adverse Supreme Court decision on the N.R.A. Mr. Ahearn stated that he considered the code of the mineral aggregates industries to have been practical and that it would have been successful had proper coöperation in its enforcement been extended by the government. Wages, prices, and employment, he said, showed marked improvement during the period of its operation. Centralized control for such a large and scattered industry is impractical, he stated, and no industry in this country is now working under a voluntary code.

The most encouraging sign during 1935 was the revival of private construction, said Mr. Ahearn, and further improvement in this field is expected during 1936. A peculiar condition during 1935 was the increased diversion of gasoline-tax money in several states at the same time that large sums were advanced by the Federal government for highway construction. He stated, however, that public-works construction by states rather than by the government was to be preferred and added that the tendency to consider public works as relief measures only constituted a real threat to an important market for aggregates. In closing Mr. Ahearn said that work on the system of cost accounting started under the aggregates code is near completion and that copies would soon be available.

The annual report of the Engineering and Research Division was submitted by Stanton Walker, director. In reviewing the history of the industry he stated that the production and processing of sand and gravel was born as an industry about 35 years ago. From an almost negligible industry it has risen to a leading place among those producing con-

EQUIPMENT EXHIBITS AT ST. LOUIS CONVENTIONS

Pioneer Gravel Equipment Mfg. Company *Minneapolis, Minn.*
Nordberg Manufacturing Company *Milwaukee, Wis.*
Illinois Powder Manufacturing Company *St. Louis, Mo.*
A. Leschen & Sons Rope Company *St. Louis, Mo.*
W. S. Tyler Company *Cleveland, O.*

Bucyrus-Erie Company *So. Milwaukee, Wis.*
Allis-Chalmers Manufacturing Company *Milwaukee, Wis.*
Koppel Industrial Car & Equipment Company *Koppel, Pa.*
Lima Locomotive Works *Lima, O.*
Easton Car & Construction Company *Easton, Pa.*

Sauerman Brothers, Incorporated *Chicago, Ill.*
Hendrick Manufacturing Company *Carbondale, Pa.*
Robins Conveying Belt Company *New York, N. Y.*
Calcium Chloride Association *Detroit, Mich.*
John A. Roebling's Sons Company *Trenton, N. J.*

struction materials, the peak having been reached in 1929 with a production of over 220,000,000 tons valued at over $130,000,000. In its earlier years, according to Mr. Walker, gravel represented only 15 to 25 per cent. of the total of coarse aggregates of construction; by 1920 it had risen to about 48 per cent., by 1928 to 55 per cent. and in recent years to about 60 per cent.

In reviewing the work of his department since its establishment 10 years ago, Mr. Walker separated its activities into two classifications: representation of the industry as a whole, and work done for individual members on specific problems. While, in his opinion, the first type of work probably yields the greatest actual return to the industry, the value of activities in the second classification is more readily measurable and more clearly evident to the member company involved.

Without attempting to give a detailed account of the work of the Engineering and Research Division in 1935 Mr. Walker reviewed briefly some of the more important engineering problems which confront the industry and the part which the association is taking in their study. "While purchase specifications are promulgated largely by local engineering bodies and while the association has had the opportunity to represent and act for local groups of member companies in the preparation of a large number of such specifications," he stated, "the principal effectiveness of the association's work comes from its close contact with the work of national standardizing bodies on which, in the last analysis, practically all local specifications are based."

According to Mr. Walker, the association's committees on standard specifications and on sizes of sand and gravel for bituminous mixtures have done highly valuable work. The Joint Technical Committee of the Mineral Aggregates Assn., he stated, has also been influential in the development of specifications which are common to the sand-and-gravel, crushed-stone and slag industries and on which many state specifications are already based. Mr. Walker stated that the association has also coöperated with members of its Manufacturers' Division in arriving at standards for diameters of wire to be used in the manufacture of wire screens. A reduction of 75 per cent. in the variety of wire diameters has already been achieved with a corresponding reduction of the diversity in sizes which must be carried in stock by producers. Many other important problems being worked on or considered were included in the paper but were not read due to lack of time.

In closing Mr. Walker referred to the growing realization by sand-and-gravel producers during the past three years of the importance of the market for bituminized aggregates and the work done by a committee appointed in 1935 to develop recommended sizes for this market. Because of the renewed demand for aggregates, said Mr. Walker, the dissemination of information is more important than ever and he held out the hope that the publication of papers on pertinent subjects would soon be resumed.

An open forum on business conditions in the sand-and-gravel industry was then held. Thirteen directors of the association or other producers from all important producing sections of the country reported on a prescribed group of 12 questions. These were sufficiently comprehensive so that the collective answers gave a fairly accurate picture of the attitude of producers in these various sections on important subjects and the conditions existing and expected.

According to these reports the volume of sand-and-gravel business in 1935 was 10 to 15 per cent. greater than that of 1934. All except four territories showed increases, the largest being 33⅓ per cent. in the Los Angeles territory and 30 per cent. in Illinois. Price levels on the average were also up, although price wars in a few localities were reported. These were attributed to the invalidation of the code and did not materially affect the general condition. Most producers were against any future code, whether governmental or voluntary, because of the impossibility of enforcement. There was, however, some sentiment in favor of the open-price policy.

According to these reports the relation of volume of demand to capacity remained at a comparatively low level. Estimates for these territories varied from 20 to 40 per cent. with an average of about 30 per cent. By far the largest percentage of the sand and gravel produced in 1935 was used for highway construction, this market taking about 60 per cent. of the total commercial output. Building construction was next in importance with 28 per cent. and of the remainder about 7 per cent. was used for railroad ballast and 6 per cent. for other purposes. There was, of course, a wide variation in the figures for the individual territories. All those reporting expect a substantial increase in business during 1936, due mainly to an increase in private building construction and in some cases also to expanded highway programs. Some increase in purchases of railroad ballast is also expected. Prices in most territories, it is thought, will increase.

Competition from plants operated by divisions of government continue to be an important factor in many territories, but, according to these reports,

NATIONAL SAND AND GRAVEL ASSOCIATION
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H. S. DAVISON, *Secretary-Treasurer*
Pittsburgh, Pa.

EXECUTIVE COMMITTEE

L. T. MCCOURT, Memphis, Tenn.
G. W. RENWICK, Chicago, Ill.
M. A. NEVILLE, Lafayette, Ind.
ERIC RYBERG, Salt Lake City, Utah

there was little if any increase in competition from contractor-operated portable plants. There is a growing feeling among producers operating permanent plants that portable units are best operated as supplements to permanent operations.

THE meeting on Thursday morning was presided over by H. P. Caldwell, Ohio River Sand Co., Louisville, Ky. Stanton Walker, director of engineering and research, first reported on the *Simplified Practice Program for Coarse Aggregates*, reviewing past efforts along this line and the benefits accruing from them. In his paper he then discussed the recommended sizes of aggregates and the reasons for their selection, also advising regarding their application. These tables of recommended sizes and substantially the same text were published on pp. 39 and 40 of December, 1935, issue of PIT AND QUARRY.

Mr. Walker next presented a progress report on the work of the Committee on Sand and Gravel for Bituminous Road Surfaces. This committee, he said, has been formed to outline specifications for bituminous mixtures in which prepared sand and gravel can be used most efficiently. According to Mr. Walker, under present practices some degree of angularity is needed for the coarse graded bituminous mixtures and it is customary to assure the desired angularity by requiring that some percentage of the gravel particles be crushed. A better measure of angularity is necessary, he stated, and this is one of the chief aims of the committee. Tentative recommendations were presented for surface retreatments for hot and cold application and original treatments over gravel or macadam bases as well as for various mixed-in-place types.

The next subject on the program was the problems involved in furnishing sand and gravel on large projects. J. L. Shiely, J. L. Shiely Co., St. Paul, Minn., whose qualifications for discussing this subject are beyond question, described his work in supplying sand and gravel for Fort Peck Dam on one of the largest contracts in the history of the sand-and-gravel industry. After a brief but interesting description of the dam and its purpose he commented on the problems encountered in meeting specifications. One fact developed early in this work was the disparity between results obtained with round-hole testing screens and square-mesh vibrating screens.

Mr. Shiely, in describing the requirement of government contracts which specify regulation of minus 100-mesh and minus 50-mesh sizes, called this a forward step which producers could profitably study. Another forward step, in his opinion, is the segregation and reblending during processing of sand fractions in order to control the gradation of sand as is being done at Grand Coulee Dam, Washington.[1]

Mr. Shiely then briefly described the various plants built by the J. L. Shiely Co. and the Becker County-Shiely Co. for this work and showed slides illustrating these operations.[2]

In the absence of L. D. Vincent the problems involved in supplying sand and gravel for the Tygart River Dam, a flood-control project near Grafton, W. Va., were described by Max E. Boyer, U. S. Engineering Dept., Pittsburgh, Pa. The contract for this material totals 1,900,000 tons, said to be probably the largest single order ever placed with a commercial producer. The chief problem encountered, said Mr. Boyer, was the lack of fines in the river deposits from which this material is obtained. This was partially solved by charting these deposits and their gradings and dredging from them in approximately the desired proportions. It was also found necessary to install a roll crusher at the new shore plant from which all of this material is shipped. A regulated amount of sizes of which there is an excess is fed to the rolls and the resulting fines are recombined with the sand in the desired percentage. The combination of these two methods of control, according to Mr. Boyer, has been highly successful.

The next paper on the program, *Trends in Aggregate Specifications*, by Stanton Walker, was not read because of time limitations. In this paper were described the principal features of recent developments which have important bearings on plant operating problems. Mr. Walker recommends that established sand and gravel producers give careful consideration to specification trends and coöperate to the fullest extent with engineers to the end that the products in which these materials are used will give a most lasting service.

H. E. Rainer, Buffalo Slag Co., Buffalo, N. Y., described the conditions at a sand-and-gravel plant operated by the company where a high percentage of shale and clay in the deposit had kept the product from meeting the stringent New York State Highway Dept. specifications. Ordinary methods of separation failed because the impurities had almost the same specific gravity as the sand and gravel. After extensive tests had been made, said Mr. Rainer, a Simplicity D'Centegrator was installed and has operated successfully for the past three years. The use of this machine reduced the loss in the sodium-sulphate test from 8.5 per cent. in the raw material to 2.9 per cent. in the finished product. The loss on the magnesium-sulphate test was reduced from 20.5 to 14.8 per cent.

Frank M. Welch, Greenville Mfg. Co., in discussing the elimination of soft particles said that the worst type of deposit is the one in which the soft stone is nearly as hard as the gravel. The impact machine is best in this case, he said, naming the D'Centegrator, the Knickerbocker soft-stone eliminator and the Greenville soft-stone eliminator as typical of this type of equipment. Where clay balls and soft material form the problem Mr. Welch recommended scrubbing as the best method, citing the

1 [This method was one of the most interesting features of the huge sand-and-gravel plant at Grand Coulee Dam of which a complete description was published in the January, 1936, issue of PIT AND QUARRY.—ED.]

2 [The two movable plants supplying toe gravel for the dam were described in the January, 1935, issue of PIT AND QUARRY and the stationary plant supplying sand and gravel for work in the October, 1935, issue.—ED.]

Hardinge and Allswede scrubbers and various makes of log-washers as efficient machines of this type.

Alexander Foster, Jr., Warner Co., Philadelphia, Pa., in commenting on the effect on plant operation of compliance with grading specifications, said that the aggregate salesman can be a big factor in a plant where there is too much or too little of some sizes. In many cases a slight revision of the specifications can be made to the advantage of both the producer and the purchaser. As a practical suggestion he recommended an optional crushing plant which allows regulation of the percentage of crushed material, especially of bituminized aggregates. Mr. Foster also stated that segregation and reblending of sand fractions was a coming thing.

A subject of great importance to all producers was discussed by the association's executive secretary, V. P. Ahearn, in his paper, *Trends in Federal Legislation*. He drew attention to industry's "abiding interest in any undertaking which promises to relieve the evils of destitution and to improve the lot of the more unfortunate." He said that industry should and would support the government's social-security program if it would not disrupt orderly government and would not upset our economic structure by incurring expense that can not be financed out of industry's earnings. With reference to the question of government finance Mr. Ahearn contrasted the government's current fiscal-year expenditures of $7,400,000,000 with those of $1,000,000,000 in 1915. The expenses of political subdivisions bring the total to more than $16,000,000,000, as compared with the 1915 figure, $3,300,000,000. The per-capita cost rose from $33.84 in 1915 to $122.52 in 1934. Government, he pointed out, costs about one-fourth of our total national income. "Legislative devices to cure our social and economic problems may have the effect of aggravating them through the drying up of capital," he said. "In the competitive struggle generated by the newer and higher costs of doing business," he added, "there will be an acceleration of the trend toward the mechanization of industry and the replacement of manual labor."

Mr. Ahearn also stated that, because of the legislative power delegated to the National Labor Relations Board, company unions are likely to be "frowned upon," that representatives chosen by the majority of workers in any establishment may be held to represent the minority as well, and that the principle of collective bargaining may be utilized to fix wages.

In opposition to the principle of government competition with industry, Mr. Ahearn quoted with emphasis the following words from a report submitted in 1932 by a Congressional committee of which Representative Shannon of Missouri was chairman:

"No constitutional authority exists whatsoever which would permit the government deliberately to engage in business in any form which competes with and impairs the private business of its citizens, except for reasons of economy, or fiscal and military expediency."

Government has not only produced materials for its own needs, said Mr. Ahearn, but "it has even gone out and competed with us in the private markets." To which he added by saying that "while government is exhorting private industry to furnish more employment at higher wages it has at the same time made it impossible for free labor to secure employment at many of our plants. . . . The most serious threat to the future of this industry is that of governmental competition. . . . Furthermore, if government may take over the functions of the sand-and-gravel industry, what reason is there to assume that it will not ultimately include all industry within its paralyzing grasp?"

As legislators must necessarily be guided by the wishes of their constituents, Mr. Ahearn asked whether this fact did not require that "we should offer to law-making bodies constructive advice and counsel on proposed legislation? Should Congress not be warned against that sort of delegation of legislative power which permits a government bureau to write its own laws?"

Speaking extemporaneously on *Occupational Diseases Under Compensation Insurance Laws*, H. V. Owens, president of the association and of Eastern Rock Products, Inc., Utica, N. Y., discussed the situation which resulted in New York from the inclusion of silicosis and other dust diseases in the hazardous-diseases provision of the state's workmen's compensation law. He referred to the plans proposed by insurance carriers. Under Plan I, he said, quarry operators would have been required to pay $5.21 per $100 of pay-roll and $300 for each claim and sand-and-gravel producers $1.16 plus $300. In one quarry the rate exceeds $22 per $100 of pay-roll. Under Plan II there was an increase of $2.12 per $100 of pay-roll plus a cash payment of $72 for each employee on the pay-roll, in addition to which the employer was required to assume six-sevenths of the cost of administration the first year and one-seventh less in each of the five succeeding years. When the new law became effective the insurance companies cancelled the policies in effect. The state insurance body accepted insurance but did not fix the rates at which it would be written. Whereas formerly producers were fearful of dust diseases on account of their assumed seriousness, they now look upon them with contempt, Mr. Owens said.

The new law may necessitate some alterations in plant equipment, if the New York Labor Board insists upon them. Mr. Owens' company was ordered to make changes costing $9,000. There is a tendency, according to Mr. Owens, to underestimate the importance of exposure to silica-bearing dusts. In the case of his own company's quarries the silica content of the rock averages not more than one-half of one per cent.

John Prince, president, Stewart Sand & Material Co., Kansas City, Mo., spoke of the threat of impending unionization of quarry labor shown by American Federation of Labor activities in the St. Louis and Kansas City areas. The federation is

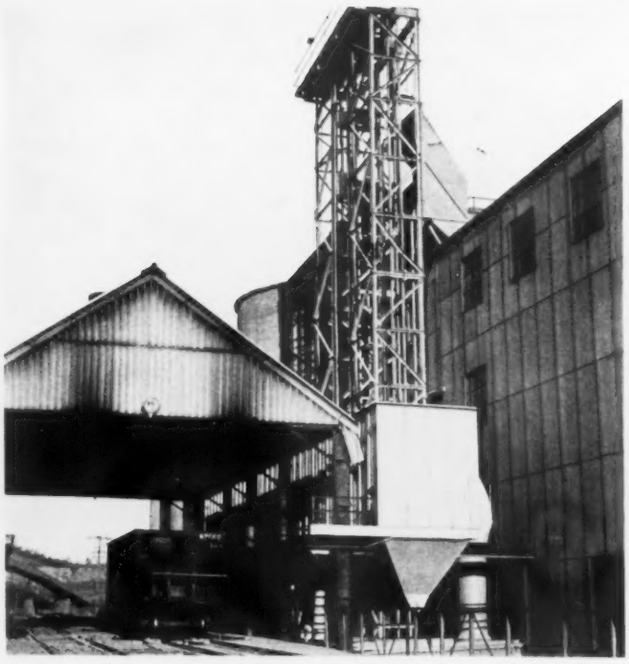
(Continued on page 48)

EQUIPMENT EXHIBITS AT ST. LOUIS CONVENTIONS

Traylor Engineering & Manufacturing Company — *Allentown, Pa.*
Simplicity Engineering Company — *Durand, Mich.*
Jaeger Machine Company — *Columbus, Ohio*
American Manganese Steel Company — *Chicago Heights, Ill.*
The Macwhyte Company — *Kenosha, Wis.*

Gruendler Crusher & Pulverizer Company — *St. Louis, Mo.*
Dravo Contracting Company — *Pittsburgh, Pa.*
Taylor-Wharton Iron & Steel Company — *High Bridge, N. J.*
Kensington Steel Company — *Chicago, Ill.*
Ludlow-Saylor Wire Company — *St. Louis, Mo.*

Blaw-Knox Company — *Pittsburgh, Pa.*
Atlas Powder Company — *Wilmington, Del.*
Marion Steam Shovel Company — *Marion, Ohio*
Eagle Iron Works — *Des Moines, Ia.*
Hercules Powder Company — *Wilmington, Del.*



Discharge trestle, skip hoists and dust collector at crushing plant of Missouri Portland Cement Co.

MISSOURI PORTLAND CEMENT CO. INSTALLS WEIGH BATCHERS TO PROPORTION RAW MIX

THE Missouri Portland Cement Co., St. Louis, Mo., which operates two cement plants at St. Louis and a third near Independence, Mo., was recently confronted with an interesting problem at the former place. Both St. Louis plants, known as No. 1 and No. 2, obtain their limestone from a quarry at Fort Bellefontaine, 9 mi. away, where the preliminary crushing is done. The problem necessitated making a choice between replacing an obsolete secondary crushing station at Plant No. 1 with modern equipment or making use of the existing modern secondary crushing station of Plant No. 2 for the requirements of both plants.

The second alternative was chosen for several reasons. By utilizing the existing crushing and handling equipment at Plant No. 2 it was possible to incorporate a new system of batching and handling which is unique in the cement industry in this country. The idea of using weighing batchers for proportioning cement raw materials occurred to Richard Uhlig, general operating manager of the Missouri Portland Cement Co., as a practical adaptation of methods he had observed in his study of glass-plant operation and practice in Europe. He saw the suitability of these methods for application to cement plant operation. The very close limitations to which raw materials for high-early-strength Portland cement must be held necessitated the use of accurate measuring equipment. This new system has shown considerable economy, a third of which is achieved in the power cost, the remainder arising from savings in operating-labor and maintenance costs.

Another reason for choosing the second alternative was the fact that the centralization of these operations made the problem of dust-collection more simple and also allowed perfect control of raw-material crushing and proportioning for delivery to both plants. Under the former system no weighing was done at Plant No. 2 while at Plant No. 1 the shale and iron ore were weighed and the limestone measured, all manually.

In order to picture clearly this improvement program to the reader a brief description of these two cement plants and their histories is necessary. Plant No. 1 is the older of the two plants at St. Louis but has been kept up to present-day standards by an intelligent improvement program. The most important recent improvement was the installation of a new finish-grinding department in 1930. This was described in the October 22, 1930, issue of PIT AND QUARRY.

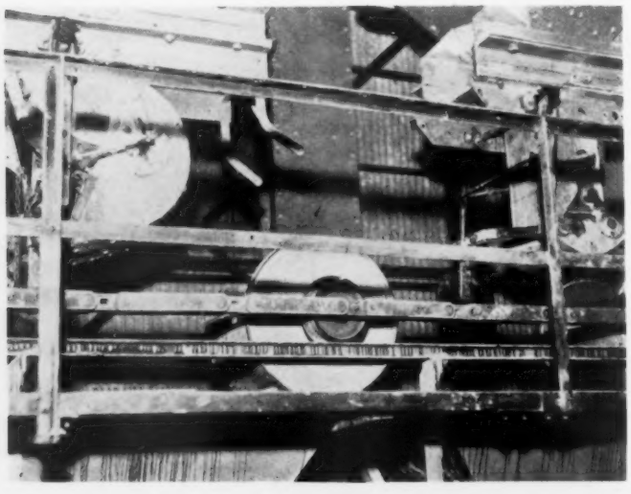
Plant No. 2, now known as the Red Ball plant, was formerly known as the Velo plant. It was built in 1928 primarily for the production of high-early-strength Portland cement and was completely described in the February 13, 1929, issue of PIT AND QUARRY. This plant, however, can be used for the production of either standard Portland cement or high-early-strength cement. All raw materials are now taken during alternating operation through the same flow in this plant.

The crushed limestone is loaded from bins at the quarry primary-crushing building into 50-ton hopper-bottom railroad cars which are hauled in trains to the plant . The cars are dumped from a double-track railroad trestle at Plant No. 2 into two track hoppers. Two 36-in. Stephens-Adamson variable-speed apron feeders discharge to two No. 5040 Dixie Mogul hammer-mills having traveling breaker plates. These in turn discharge to two automatic Beaumont skip-hoists which have 3-cu. yd. buckets and a 95-ft. lift. This part of the plant remains unchanged.

Under the former arrangement the skip-hoists discharged their contents into raw-material proportioning bins, from which the materials were discharged into the buckets of an F. L. Smidth Cylcup continuous conveyor which could discharge either to the raw-grinding mill feed bins or to a large concrete-silo raw storage. This arrangement had the distinct disadvantage of lifting the crushed material 95 ft. for a drop back to almost crusher-floor elevation. This uneconomical condition was eliminated by changing part of the upper track of the

Cylcup conveyor so that the skip-hoists now discharge into hoppers which feed directly to the conveyor as shown in the accompanying drawing.

Two of the four concrete silos formerly used for limestone and shale storage are now used for either limestone or shale storage, or both, depending on weather conditions which might interfere with the shale pit operation. The other two silos have been rebuilt with a reinforced concrete floor placed about half-way up the height of the bins and supported by reinforced-concrete columns. The additional space thus provided is used for the new raw-material batching and handling equipment. One of the rebuilt silos is now used for limestone and the other is divided into compartments for shale, iron ore, fire clay and fluorspar. The rebuilt limestone silo has a useful storage capacity of 900 tons and the 4 compartments of the other silo hold 350, 150, 300 and 200 tons respectively of shale, iron ore, fire clay and fluorspar. The two original storage silos hold 3,300 tons each. The fluorspar is used as a flux and the iron ore to control the tri-calcium-aluminate content. The Cylcup conveyor has a capacity of about



Gates feeding from hoppers to pivoted-bucket conveyor. Old type of gate at left is being replaced with new type at right.

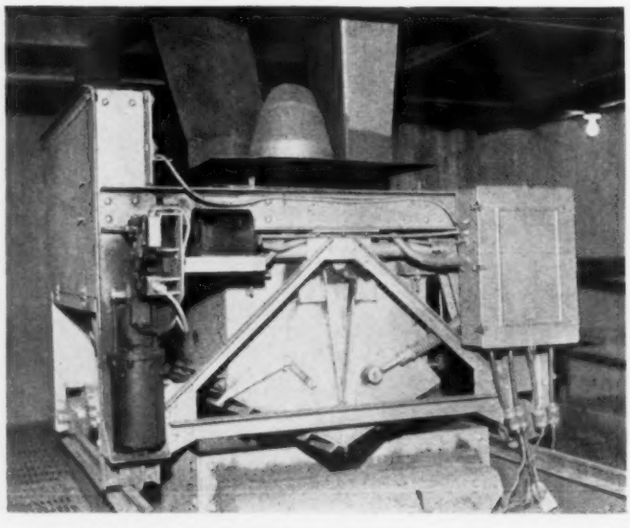
8 cu. ft. per bucket and is operated at speeds varying from 62 to 91 ft. per min.

Under the rebuilt limestone silo two 42-in. Chain Belt apron feeders discharge the limestone to a stationary Blaw-Knox automatic weighing batcher of 10,000-lb. capacity. These feeders are driven by a common motor and speed reducer. Under the other rebuilt silo are two sets of table feeders of the company's own design. One set of two feeders handles shale and iron ore when making standard Portland cement. A separate set of three table feeders handles shale, fire clay and fluorspar for high-early-strength Portland cement. These feeders are individually driven by 5-hp. Westinghouse motors through Falk speed reducers. A movable 2500-lb. capacity Blaw-Knox weighing batcher on rails can be placed under either set of feeders depending on the type of cement raw material desired. This arrangement also gives sufficient flexibility of raw-material blending to meet any future changes in cement specifications at either of the two plants.

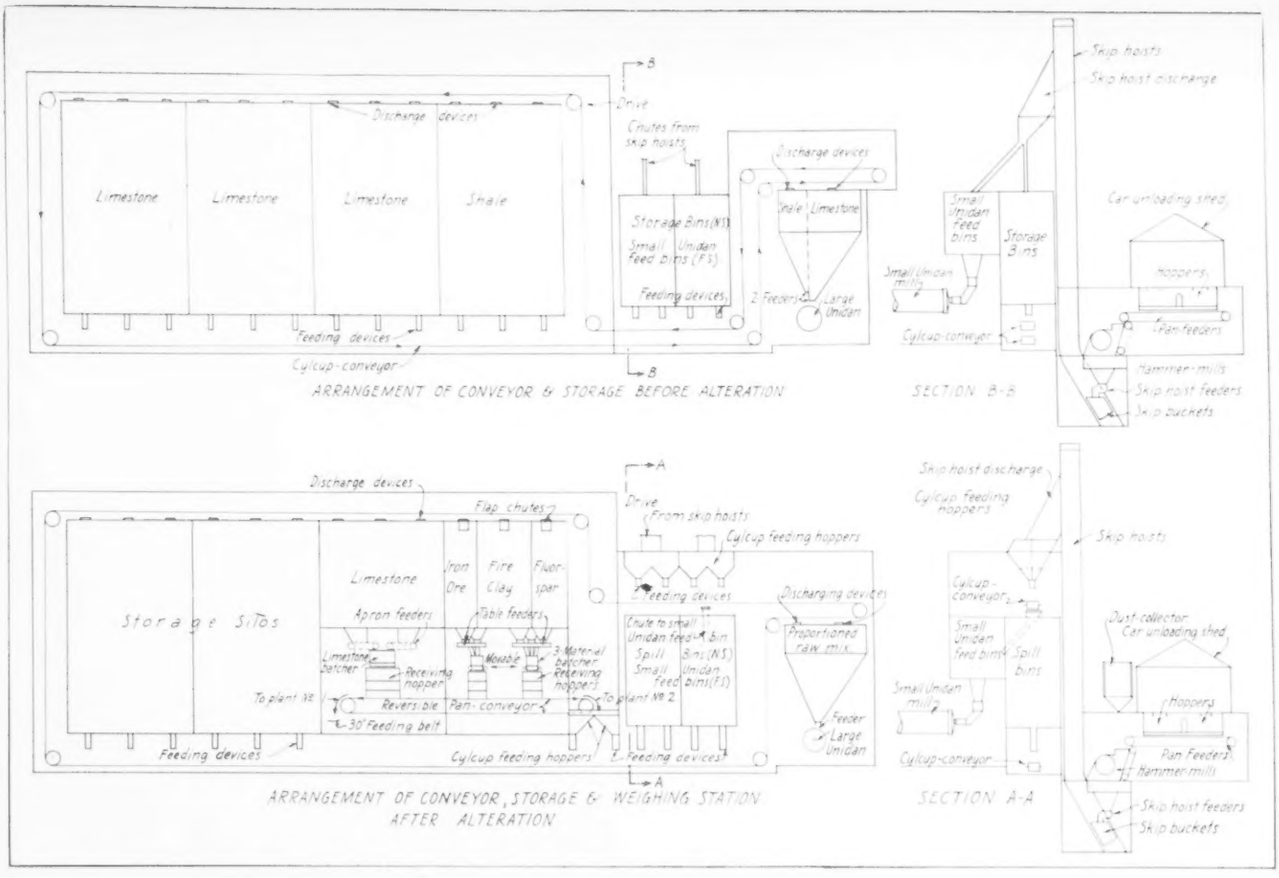
The 3-material batcher is supported on an overhead suspension hopper scale with three charging beams and one empty beam and with an "empty" and "full" springless indicator on top of the beam box, which is also equipped with electrical contacts. The indicator is connected to the scale beam through an equalizing bar in such a manner that when the counterpoises are set for a given batch, the indicator will show balance at the full position when the proper amount of material is in the hopper, and will come to balance at empty when the material has been fully discharged. In batching the materials into the hopper consecutively the table feeders are started and stopped and the scale beams thrown in and out of action by means of a thrustor-operated mechanism which includes a drum switch to change over the electrical connections operated by cam and ratchet mechanism, which also operates the scale beam locks. The clam-shell-type discharge gate is operated by a 1-hp. geared-head motor.

In operation this batching system functions automatically. When operating the set of three feeders for high-early-strength Portland cement, only three of the four scale beams on the movable batcher are used. When the discharge gate is closed, the table feeder handling the first material to be weighed is automatically started. This material is weighed on the first or upper beam in the scale box and as the second and third weigh beams have been automatically locked when the discharge gate was previously opened, the material will be fed into the hopper until the scale comes to balance at a weight corresponding to the setting of the first counterpoise. When the scale comes to balance with the first material being weighed in the hopper, the first table feeder is automatically shut off and the second table feeder automatically started, the second scale beam also being automatically unlocked, allowing it to come into action so as to weigh material No. 2.

When the second material brings the scale to balance, the second table feeder is shut off and the third table feeder started automatically, and at the same time the third scale beam is unlocked. When the



Automatic three-material weighing batcher mounted on rails in the new raw-material proportioning department of the Missouri Portland Cement Co.

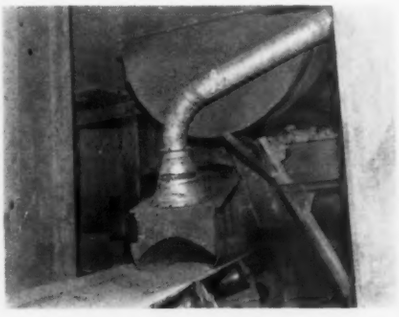


third or last material is fully weighed and the scale comes to full balance, the thrustor and drum switch mechanism automatically moves to its fourth or discharge position. The batcher is discharged by a Telechron-clock-operated switch which makes a contact every two minutes, but material can not be discharged unless the drum switch is at the fourth or discharge position.

When operating the two table feeders for standard Portland cement, the same procedure is followed except that only two materials, shale and iron ore, are weighed in sequence on two beams of the movable weighing batcher and limestone is again weighed in the stationary batcher. When only two materials are weighed the thrustor and drum switch mechanism moves directly from position No. 2 to position No. 4 immediately after the second material has been weighed. The fourth scale beam on the small weighing batcher and a second beam on the limestone batcher are control beams for adjusting the varying weight of the batchers. Under either condition the batching system has a total maximum capacity of 187.5 tons per hr.

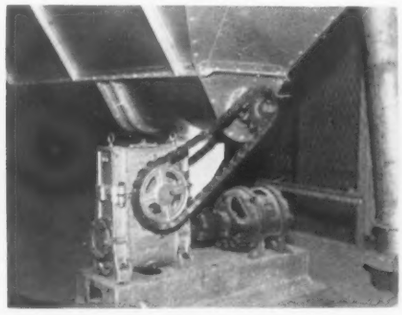
The limestone batcher hopper is rectangular in shape and the use of two feeders with discharge spaced approximately 4 ft. apart insures the most economical use of the hopper capacity as it is possible to fill the hopper practically level full without any spilling. The scale is of the same general type as that on the 3-material batcher but has only one charging beam and an empty beam.

The two apron feeders are automatically started when the discharge gate is closed and the material feeds into the hopper until the electric contact in the scale indicator is closed at the predetermined cut-off point. The discharge gate is of the clam-shell type operated by a 2-hp. geared-head motor and a dead-center crank mechanism, similar to that on the

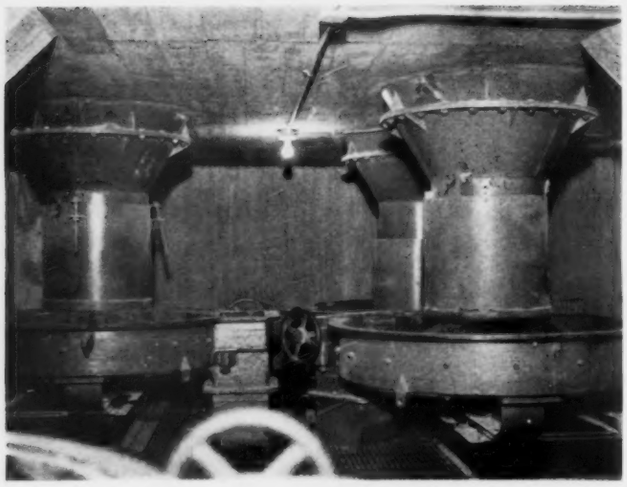


Discharge from pan conveyor to cross belt conveyor with connection to dust collector.

Motor-reducer drive of one of the five table feeders above the movable weighing batcher.



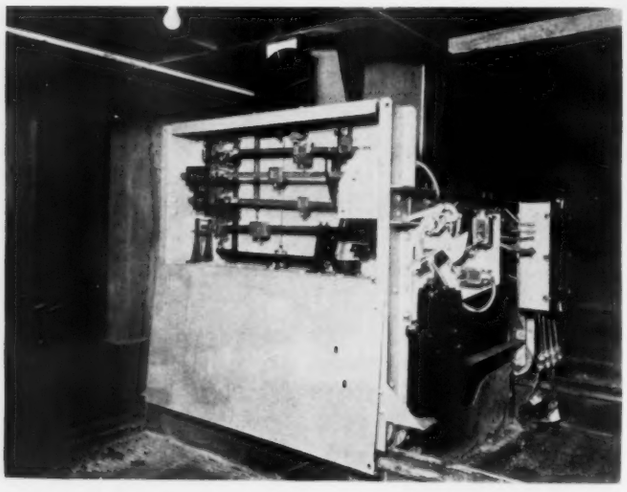
Motor, reducer and chain driving collecting screw under one of the two dust collectors.



The set of three table feeders which feed shale, fire clay and fluorspar to the movable batcher.

3-material batcher. The electrical control box on this batcher is also similar to that on the 3-material batcher with the exception that it contains a Telechron-operated switch adjusted for a 2-min. total cycle.

The batchers are so interlocked that when the clock makes contact at the end of two minutes, both batchers will be discharged simultaneously if they have both been filled to the correct weight. If one



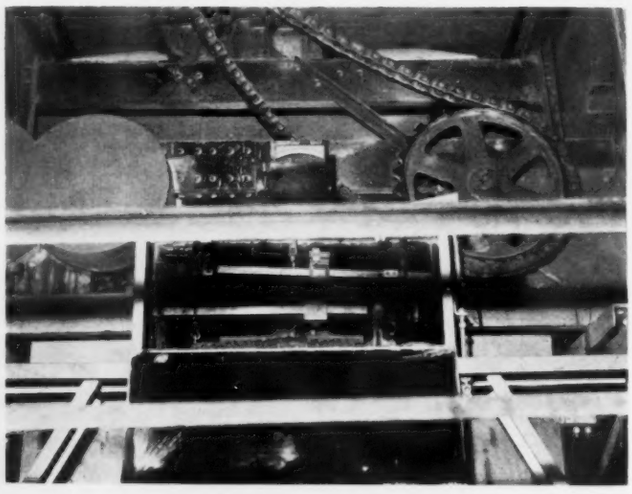
Another view of three-material weighing batcher with scale box open showing the four beams.

of the batchers has not been filled to the correct weight, due to trouble with the feeders, etc., neither batcher will be discharged until the clock again makes contact, provided that the batcher has been filled during the interim.

Both batchers are equipped with a telltale relay and remote indicating lamp, which is placed at a convenient point so that the supervisor may know that the batchers are functioning properly at all times. The lamps will light when the batchers are full and go out when the batchers are empty. The operation of these batchers is fully automatic in all respects, requiring no attendant for their continuous operation.

A 30-in. reversible Chain Belt pan conveyor, set on 68-ft. centers under the two batchers, receives the batched materials. This conveyor has a capacity of 160 tons per hr. at a chain speed of 55 ft. per min. When operating Plant No. 1, which produces only Red Ring standard Portland cement, the batched limestone, shale and iron ore are discharged from one end of this pan conveyor on a 30-in. by 20-ft. centers cross belt-conveyor. This feeds a 30-in. by 325-ft. horizontal belt-conveyor operating in a 350-ft. concrete tunnel connecting the two plants. At plant No. 1 this conveyor discharges the raw material on a 30-in., 39-deg. inclined Chain Belt pan conveyor set on 110-ft. centers which delivers it to the concrete feed bins of the three No. 106 F. L. Smidth wet raw-grinding Kominuters.

The concrete tunnel is in itself a notable engineering feat as it passes under the railroad trestle, sev-



Side view of limestone weighing batcher with scale box open. Speed reducer and chain drives of the apron feeders above.

eral switch tracks, two concrete roadways and the plant machine shop. The tunnel is 8 ft. wide by 7 ft. high inside and has 12-in. floor, sidewalls and roof of reinforced concrete. Copper strip seals at all floor, sidewall, and expansion joints prevent water seepage. The channel for this tunnel was excavated in open places and mined under existing structures.

When operating Plant No. 2 for standard Portland cement, the travel of the pan conveyor under the batchers is reversed and the same mix is taken by the lower track of the Cylcup conveyor to the Plant No. 2 raw-grinding mills.

The Red Ball mix of limestone, shale, fire clay and fluorspar is conveyed only to Plant No. 2, as Plant No. 1 is not used for the manufacture of high-early-strength Portland cement. This mix is also taken to the Plant No. 2 raw-grinding mills by the Cylcup conveyor.

Both plants now have enough mill-feed-bin capacity to keep them operating simultaneously for a relatively short operating period. If, however, present conditions change, so that continuous operation of both plants will be required, an additional two-material weighing batcher can be installed. This will eliminate the necessity for moving the present three-material batcher from one set of feed-

(Continued on page 46)

SLAG ASSOCIATION STRIVES FOR WIDER USE FOR PRODUCTS

H. N. Snyder, Buffalo, N. Y., president of National Slag Assn. for 1936.

AT the opening session of the National Slag Assn. convention at St. Louis on January 28 Manager-Director H. J. Love reviewed a year of active organization work in the preparation of reports and presentations. He mentioned 19 papers issued to members during the year on cement, 4 on nonmetallic filler, 2 on new uses for slag, 3 on slag as an oyster culture medium, 17 on stabilized roads, 2 on slag wool, one on colored granules, and one on glass making. He voiced the belief that "in one manner or another, and before very much time has elapsed, we will go through a process of 'regimentation.'" This, he hopes, will provide for a survey of the slag industry.

He reported that, as the result of contacts with various government departments, slag is "well known and most favorably considered as a desirable aggregate for runways in airport construction."

In referring to the tendency of some government departments to disregard the recommendations of the Federal Specifications Board, Mr. Love said that, since that board had, as its chairman said, only moral suasion behind it, he still believes that "the engineer in the field is the man to whom slag must be sold."

Fred Hubbard, the association's director of research, in his report on his department's activities, said that he has begun a series of tests to determine whether the Los Angeles abrasion test will reject undesirable materials and accept satisfactory materials and to determine what specification limits should be set in order properly to classify slag aggregate. Tests are also being made of other aggregates.

Mr. Hubbard plans to make tests on hot and cold bituminous mixtures using the same aggregates as are used in the series just mentioned and employing the apparatus developed by Dr. Kriege of the France Stone Co.

An investigation of the causes of disintegration of a concrete road in Preston County, W. Va., disclosed the unsuitability for aggregate purposes of slag containing ferro-manganese.

As the result of a series of tests being made by the association laboratory, the Pittsburgh testing laboratory and Prof. M. S. Douglas of the Case School of Applied Science, it seems evident that the failure of slag to produce concrete of the required strength on an F. H. A. low-cost housing project in Cleveland was due to improper manipulation of the materials and the use of too much water. Slag has already been reinstated on the job.

Mr. Hubbard urged an expansion of the association's research activities, mentioning stabilized roads and the proper composition of bituminous mixtures as subjects needing investigation.

The afternoon meeting, presided over by Fred Hubbard, was opened with an address on *Soil Stabilization* by C. A. Hogentogler, senior highway engineer, U. S. Bureau of Public Roads. Not only theory and laboratory determinations but practical application was described. The fact that materials can not be mixed indiscriminately because of the varying affinity of some materials for others was

GROUP PHOTOGRAPH TAKEN AT THE 1936 CONVENTION OF NATIONAL SLAG ASSOCIATION, ST. LOUIS, MO.

Front Row: (Left to right) H. J. Love, National Slag Association; C. A. Hogentogler, U. S. Bureau of Public Roads; Miss G. M. Thompson, National Slag Association; P. H. Bates, United States Bureau of Standards; C. L. McKenzie, Duquesne Slag Products Co.

Rear Row: L. E. McDermut, Illinois Slag & Ballast Co.; Fred Hubbard, Standard Slag Co.; W. W. Lavers, Great Lakes Steel Corp.; K. A. Dietrich, Great Lakes Steel Corp.; E. L. Flad, Carnegie-Illinois Steel Corp.; C. E. Ireland, Birmingham Slag Co.; G. A. Mattison, Jr., Woodstock Slag Corp.; H. N. Snyder, Buffalo Slag Co.; G. C. McCullough, Birmingham Slag Co.; W. E. Bliss, Standard Slag Co.; H. M. Kraner, Bethlehem Steel.

NATIONAL SLAG ASSOCIATION

1936

OFFICERS

H. N. SNYDER, *President*
Buffalo, N. Y.
C. E. IRELAND, *Vice-President*
Birmingham, Ala.
H. J. LOVE, *Secretary-Treasurer*
Washington, D. C.

impressed upon those present. The speaker also described the effect on different soils of various chemicals, such as sodium chloride, sodium silicate, calcium chloride, hydrated lime, etc.

W. W. Lavers, slag sales division, Great Lakes Steel Corp., Detroit, Mich., in his address on *Commercial Plant Mixes* described the study of materials and tests made by his company in coöperation with the Dow Chemical Co. and the Calcium Chloride Assn. which preceded the erection of a commercial plant for the production of stabilized road material. Mr. Lavers then described this plant which is operated by a subsidiary known as the Road Materials Co. The necessity for positive control of the correct quantities of the proper materials, according to Mr. Lavers, makes the production of this material a proper function of the slag producer. In closing he mentioned that a complete description of this operation would be published by PIT AND QUARRY. A complete description of this plant and the methods used in producing this material is published elsewhere in this issue.

The last speaker on the program, P. H. Bates, chief, Division of Clay and Silicate Products, National Bureau of Standards, presented a paper on *The Use of Blast-Furnace Slags in the Manufacture of Hydraulic Cement*. Mr. Bates stated that the use of slag in the manufacture of hydraulic cement antedated that of Portland cement by three years. Slag was pulverized with quicklime, a procedure which is still followed to some extent in this country. The first use of slag in the manufacture of Portland cement, he said, was made to retard the set.

The three possible outlets for slag to the cement industry, all of which are used at the present time, according to Mr. Bates, are as a raw material, as a blending material ground with the clinker, and as the major ingredient to which lime or gypsum is added. He then went into a detailed but very interesting description of the various types of slag cements and their characteristics. There is, according to Mr. Bates, a possibility of widely extending the use of blends of slag and other materials in this country.

The association elected for 1936 the following officers: President, H. N. Snyder, secretary-treasurer, Buffalo Slag Co., Buffalo, N. Y.; vice-president, C. E. Ireland, president, Birmingham Slag Co., Birmingham, Ala.; and secretary-treasurer, H. J. Love, manager-director of the association. The retiring president, C. L. McKenzie, had served as head of the organization for many years.

MISSOURI CEMENT *(from page 46)*

ers to the other and will confine changes to the reversal of the pan conveyor under the batchers. Ordinarily only the No. 1 plant is used for standard Portland cement production because of the economic advantages of multi-kiln operation.

Both the crushing equipment and the new proportioning and handling equipment at Plant No. 2 have been connected to two new Northern Blower Co. "Norblo" dust-collectors, each 40 ft. long. These are located between the crusher building and the unloading trestle. Each dust-collector unit has a fan with a capacity of 26,000 cu. ft. per min. at 8-in. suction pressure. These units can be operated individually or together as desired.

The entire improvement program was carried out under the direction of Mr. Uhlig who conceived it and designed the new lay-out.

The two Blaw-Knox automatic weighing batchers are equipped with Fairbanks beam scales. The feeders under the skip-hoist hoppers and the table feeders in the new batching plant are of the company's own design and construction. The two new belt-conveyors installed have Link-Belt idlers and pulleys, and Manhattan conveyor belting. All the new equipment units are driven by individual motors with Falk speed-reducers. The Chain Belt Co. supplied the two apron feeders over the limestone batcher and the collecting pan conveyor under the batchers.

MANANA

The Spanish have a word—*Mañana*—meaning "tomorrow."

We recommend it to those who believe that cut prices mean more business.

Some of us seem to think that when there isn't enough business to go around; when contracts are small and few, that a cut price will mean more business. Of course it may for the moment and for the cutter, but—do we want that kind of volume?

Volume at a loss doesn't mean anything; and generally speaking, the only place it gets us is in the bankruptcy court; or into general business oblivion.

Tomorrow we will cut the price—not to-day; on the next contract not on this one. Next year we can take some contracts at a loss and so build up a bigger business, but not this year.

When we are tempted to take business at a loss; to meet our competitor's price (which will only be cut further if we do meet it) *mañana* is a good word to remember.—*Reprinted from "Asbestos."*

PRE-MIXED-CONCRETE INDUSTRY PREPARES FOR ACTIVE SEASON

J. L. Shiely, St. Paul, Minn., elected president of National Ready Mixed Concrete Assn.

THE sixth annual convention of the National Ready Mixed Concrete Assn. held at St. Louis, Mo., January 31, 1936, left no doubt in the minds of the observers that the ready-mixed concrete industry is resuming where it left off early in the depression and that producers are actively preparing for a sharp increase in business this year. Attendance was better than in any recent year, especially at the afternoon session when a number of timely and interesting papers were presented.

The meeting on Friday morning was presided over by H. F. Thomson, president of the association and vice-president of the General Material Co., St. Louis, Mo. Mr. Thomson briefly reviewed some of the work the association has done in helping ready-mixed-concrete producers to obtain a share of the W.P.A. work. This was done by persuading W.P.A. officials to purchase concrete and other building material through established dealers. He commented on the growth of the organization during the past year as a factor in increasing its capacity to help the industry. In closing Mr. Thomson suggested as worthy of study by every producer subjects including statistics, merchandising methods, uniform cost accounting, and truck insurance.

V. P. Ahearn, executive secretary, gave a brief *résumé* of the business of the association. As a suggestion for the future he recommended that the association develop something similar to the report of the committee on resolutions of the Mineral Aggregates Institute. This report, reviewed in some detail in the report of the Mineral Aggregates Institute meeting published elsewhere in this issue, recommends action by aggregate producers in endorsing or combating legislation or other factors affecting these industries.

Stanton Walker, director of engineering, next briefly reviewed some of the major activities of his department during the year, stating that most of these would be discussed in detail in papers on the program. He closed his report with a brief outline of future plans.

The open forum on business conditions left no doubt in the minds of those present that the industry is on its way to better days. Speakers from all parts of the country gave their answers to twelve questions which touched on every important subject affecting the industry. While most of the producers reporting were from comparatively large cities yet their reports are considered to be indicative of general conditions in this industry.

Reported increases in volume of business in 1935 over 1934 ranged from 25 to 400 per cent. with the majority reporting an accompanying decrease in price. An increase in both volume and price is expected this year by all reporting. Percentage of plant capacity utilized, ranged from 30 to nearly 100 per cent. with an average of at least 50 per cent.

Opinion was divided on the value of a code to the industry but the majority expressed themselves in favor of a code which would enforce the open-price provisions and basement price levels. These reports also developed the fact that in 1935 by far the largest percentage of the concrete produced went to complete servicing of large projects, ranging from 40 to 80 per cent. in individual cases. From 20 to 50 per cent. in individual cases went to servicing small projects but there was very little reported stand-by servicing of large projects. A considerable increase in volume sold to small projects is expected. The reports also indicate that ready-mixed-concrete operators in all parts of the country are now accorded the regular dealer discount by cement makers.

In a paper, *Specifications for Ready-Mixed Concrete*, Stanton Walker briefly reviewed the history and growth of the ready-mixed-concrete industry. Twelve years ago, he said, there were only about 25 commercial plants in existence while to-day there are approximately 400 with a total production last year of over 3,000,000 cu.yd. with a value of over twenty millions dollars. Mr. Walker also traced the improvement during this year in methods of concrete mixture design and production.

Alexander Foster, Jr., Warner Co., Philadelphia, Pa., chairman of the nominating committee, then read the nominations for officers of the association for 1936. The entire slate was approved and elected unanimously. J. L. Shiely, Guarantee Concrete Co., St. Paul, Minn., is the new president. All vice-presidents were reëlected. J. H. Dixey, Transit Mix

Concrete Co., Inc., New York City, is secretary; Stephen Stepanian, Arrow Sand & Gravel Co., Columbus, O., replaced Mr. Shiely as secretary; and T. E. Popplewell, Fort Worth Sand & Gravel Co., Fort Worth, Texas, is member-at-large.

Alexander Foster, Jr., presided over the afternoon session which was devoted to the reading of technical papers. The report of the technical problems committee was presented by its chairman, R. B. Young, Ontario Ready Mix Concrete Co., Ltd., Toronto, Ont. This committee, which has functioned for almost two years, is primarily a planning committee which chooses from the many problems confronting the industry those most urgently in need of solution and considers how best the knowledge of these problems may be advanced. In his address Mr. Young gave a comprehensive outline of technical problems of the industry and the work which this committee has initiated.

E. W. Dienhart, Cement Products Bureau, Portland Cement Assn., Chicago, Ill., in his paper *Construction of Reinforced-Concrete Houses Offers a New Market for Ready-Mixed Concrete* outlined the advantages to the producer of fitting his product to home construction which shows all indications of a coming boom. Sentiment among architects, builders, and home owners, he stated, shows a strong trend toward fireproof construction. As the reinforced-concrete house best serves this market Mr. Dienhart recommended that producers keep in touch with the developments in this field and support this program.

E. B. Rayburn, Jr., Ready Mixed Concrete Corp., Indianapolis, Ind., next addressed the meeting on *Operation of a Modern Ready-Mixed-Concrete Service*. According to the speaker a producer interested in his future will supplement his sales efforts by a complete concrete service calculated to hold customers after the initial sale is made. There is, he stated, no longer any place in this industry for the fly-by-night operator as he can not compete with anyone offering a product and service of value. He then went on in considerable detail to discuss the various phases of plant operation and design, the various types of plant and delivery equipment, winter operation, testing, mixture design, advisory service, job servicing, delivery, complaints, etc.

R. B. Young again addressed the meeting, this time on the subject of *When Concrete Goes Wrong and Why*. This was an illustrated lecture which showed the various types of concrete failures and the reasons to which they are attributed. A knowledge of this subject, according to Mr. Young, is invaluable when complaints are received from consumers that concrete or materials are faulty.

NATIONAL READY MIXED CONCRETE ASSOCIATION

1936

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SAND AND GRAVEL (from page 39)

attempting to organize truck drivers and to erect a vertical union of workers engaged in quarrying and in the Kansas City area it has endeavored to unionize all quarries near the city. The largest quarry, which was politically controlled, met the union demands and Mr. Prince's concern did likewise. One operator who refused to conform experienced the stoppage of his operations by the arrival of a hundred men in automobiles, and was induced to sign the agreement.

The federations attempts have had the support of the building crafts who refuse to accept material not produced by union labor. The policy of the federation places quarry workers in the building crafts. According to Mr. Prince, producers have agreed not to service jobs requiring either union or non-union-produced material, endeavoring in that way to preserve open-shop conditions. In St. Louis dealers as well as producers have been affected. They encouraged the formation of an independent union but this has not been given A. F. of L. recognition.

Although Mr. Prince said that unionization of his company's employees would not make much difference, he considers that the attempt to organize truck drivers of all types in one union offers a real threat to city life. Union drivers might refuse to service non-union jobs and this would be serious, in Mr. Prince's opinion.

President Owens declared that the association's directors believe that there are many problems common to all divisions of the aggregates industries that can be handled by the Mineral Aggregates Institute but that they do not favor relinquishing any association powers or activities to a joint body. He explained that the economic phases of the problem are important.

As its officers for 1936 the association members present chose Alexander Foster, Jr., vice-president, Warner Co., Philadelphia, Pa., as its president; J. Rutledge Hill, vice-president, Gifford-Hill & Co., Dallas, Tex., as its vice-president; and H. S. Davison, secretary-treasurer, J. K. Davison & Bros., Pittsburgh, Pa., as its secretary-treasurer. The new executive committee consists of these officers and Lee T. McCourt, general manager, Central Sand & Gravel Co., Memphis, Tenn.; M. A. Neville, vice-president, Western Indiana Gravel Co., Lafayette, Ind.; George W. Renwick, vice-president, Chicago Gravel Co., Chicago, Ill.; and Eric Ryberg, president, Utah Sand & Gravel Products Corp., Salt Lake City, Utah.

FEDERAL WORKS AND LEGISLATION DISCUSSED AT JOINT SESSION

PRODUCERS attending the annual conventions of the national crushed-stone, sand-and-gravel and slag associations met in St. Louis on the 29th of January in a joint session, arranged by the Mineral Aggregates Institute to consider problems of common interest. Two representatives of the Federal government and a former chairman of the Federal Trade Commission discussed the government's program for industrial recovery and the outlook for industrial coöperation under government supervision.

Speaking on *The Function of Federal Public Works in the Stimulation of Industrial Recovery*, Col. Horatio B. Hackett, assistant administrator of the Public Works Administration, drew attention to the fact that, except for some huge projects which involve the expenditure of many millions of dollars and will not be completed for two or three years, "most of the projects for which allotments were made under the original program will have been completed by the end of the current construction season."

The Federal Emergency Administration of Public Works, established to administer Title II of the National Industrial Recovery Act, received, under the Work Relief Appropriation of 1935, 11,700 applications for grants totalling $1,500,000,000, for the satisfaction of which the P. W. A. had been allotted only $327,000,000. Of the 7,500 projects selected as meeting the President's four conditions—(1) that they would be started by Dec. 15, 1935, (2) that they could be finished by Dec. 15, 1936, (3) that the man-year cost would be approximately $850, and (4) that the labor should be taken from relief rolls—limitations of the allotment made it possible to approve only 4,100. Ninety-five per cent. of these, as calculated in terms of money cost, are either under contract for construction or out for bids.

Col. Hackett explained, as a fact of special interest to aggregates producers, that of the total funds allotted to the P. W. A., $1,742,000,000 is devoted to the purchase of materials, and that of the total 17 per cent., or $300,000,000, will be spent to buy stone, clay and glass products. The first P. W. A. program, he said, has provided 3,400,000 man-yr. of employment, the grants being limited to 30 per cent., the remainder being loans to public agencies. The P. W. A. accepted about $750,000,000 of securities, of which $303,000,000 worth of local bonds was sold through the R. F. C. at a profit of $4,750,000 to the government. Under the new program more than half of the states and municipalities whose applications were approved by the P. W. A. have been able to finance their 55 per cent. through private investment agencies.

Of P. W. A. money, $576,000,000 has been given for roads and highways, $540,000,000 for fireproof court houses, city halls and schools, $350,000,000 for public-service enterprises (water, sewerage and electric systems), and $287,000,000 for water-power, flood-control and reclamation projects.

"Direct relief has been imperative due to our failure to plan in advance any program to check the disasters caused by uncontrolled economic panic," said Col. Hackett. "One of the soundest and most statesmanlike undertakings in which we could engage would be a system of useful public works, which, while taking up the slack in employment, at the same time would add to our national assets. . . . If we admit the theory that during a time of depression it is necessary to keep money pulsing in order to bring about a return of prosperity, and if the situation is such that, as has been the case during the last few years, only public moneys, whether national, state or local, are available to supply the circulation without which health can not be restored to our economic system, then I submit that there is no choice except for the people to do *en masse* what individuals can not or will not do. They must invest in the future of America. If America has the economic resiliency that we believe it to have, there is little risk in such adventuring, provided that we are reasonably prudent."

The speaker made a strong plea for the maintenance of agencies for planning future public works, such as the National Resources Committee under whose direction planning committees have been set up in 46 states and Alaska.

The paper of Col. Lawrence Westbrook, assistant

LARGE GROUPS IN ATTENDANCE AT CONVENTIONS AND SHOW

Producers:

General Crushed Stone Co.	12
East St. Louis Stone Co.	7
Marble Cliff Quarries Co.	5
Columbia Quarry Co.	5

(One company had four representatives; ten had 3 representatives each; thirty-five had 2 each; and 75 had 1 each.)

Equipment Makers and Publications:

Bucyrus-Erie Co.	11
Hercules Powder Co.	8
Nordberg Mfg. Co.	7
Illinois Powder Mfg. Co.	7
Allis-Chalmers Mfg. Co.	7
American Cyanamid & Chemical Co.	7
E. I. du Pont de Nemours & Co., Inc.	6
Link-Belt Co.	6
Chain Belt Co.	5
Marion Steam Shovel Co.	5
Pit and Quarry	5
Rock Products	5
Robins Conveying Belt Co.	5
Trojan Powder Co.	5

(Seven companies had 4 representatives each; 12 had 3 each; 16 had 2 each; and 29 had 1 each.)

administrator of the Works Progress Administration, dealt with the construction program of his organization. He criticized statements which have claimed that, because the depression is over as far as perhaps three-fourths of the country's population is concerned, there should no longer be any need for giving assistance to the destitute, or at least that such a need should be greatly diminished.

The government is still providing the purchasing power of a large section of the population and this provision must continue "until opportunities for private employment become available", said the author, or the upward trend of business will be reversed. "Considerably more than 10 per cent. of the total business being transacted in the United States results directly from government activities."

He quoted figures collected by the United States Conference of Mayors to show the continuing need for relief. The executive director of that body wrote: "There are about 3,200,000 persons who have come from relief rolls who are now working on the Federal work program. There still remain at least 500,000 employable persons on local relief who have not yet been taken care of. The existing relief load of the cities, counties and states is now around 2,000,000 cases, and this residual load will probably constitute a financial burden without Federal aid during the next year—a load which the cities, counties and states must carry."

These data are based on reports filed by 150 cities and 30 states. The letter states further that in spite of the Federal government's present gigantic program, "the residual load (2,000,000 cases) will severely tax the resources of many of the cities, counties and states."

The principal objective of the program is to see that the destitute receive the necessities of life, and Congress has decided that these should be supplied through the provision of work opportunity rather than through the granting of direct relief, even though work relief costs more "out of pocket" than direct relief. "From the cost of work relief, however, must be subtracted the value of the projects accomplished. To the cost of direct relief must be added the incalculable cost of the damage to self-respect and self-reliance of the recipients. The subtraction of the one and the addition of the other should leave little doubt in the minds of thinking people as to the wisdom of the choice that was made."

Col. Westbrook emphasized the fact that the determination of the kind of project to be undertaken rests with local government units. The W. P. A. grants labor and materials only and not money. He said, too, that the W. P. A. does not own or operate pits or quarries in competition with commercial facilities but that this, also, is done by local authorities. The government, although it is opposed to such competition, can not interpose any objection to local governments producing their own materials so long as they use relief labor and do not use Federal funds to purchase plant equipment which will be used on projects not financed by the government.

The colonel estimated that between 300 and 400 million dollars will be used this year on secondary roads of which tens of thousands of miles will be built. He expects that the maintenance of these roads will require more material than their original construction.

A. J. Alport, assistant state administrator of the W. P. A. in Missouri, who read Col. Westbrook's paper, explained that the W. P. A. received only 37 per cent. of the $4,000,000,000 appropriated by Congress yet it has employed 80 per cent. of those at work. About 42 per cent. of W. P. A. money was earmarked for roads and streets, new construction and repair. He said that 20,950 projects costing $408,000,000 are in progress or completed. Of W. P. A. money 11.8 per cent. went for parks and playgrounds, 9.2 per cent. for public buildings, 9 per cent. for water supply and sewerage systems, 6 per cent. for flood control, 6 per cent. for sewing rooms, etc., 10 per cent. for health and sanitation, and 6 per cent. for professional and scientific ("white-collar") projects.

Under questioning Mr. Alport said that leased plants will be turned back to their owners after the completion of their W. P. A. work and will not thereafter be operated in competition with commercial producers.

In his talk on *The Future of Industrial Coöperation Under Governmental Auspices* Abram F. Myers, former chairman of the Federal Trade Commission, remarked that "the Federal government has not grasped, but has had saddled upon it, the

ANALYSIS OF ATTENDANCE

	Crushed Stone	Sand and Gravel	Slag	Net Totals
Producing companies' representatives	97	99	12	208
(Companies represented)	(48)	(67)	(10)	(125)
Association employees	6	4	3	13
(Associations represented)	(1)	(1)	(1)	(3)
Equipment-manufacturing companies representatives				204
(Equipment-manufacturing companies represented)				(86)
Trade-publication representatives				10
(Trade publications represented)				(2)
Guests	53	30	2	85
	156	133	17	520

powers and functions which give birth to so much apprehension." Both political parties "have vied with each other in enlarging the sphere of activity and influence of the Federal government."

Despite the N. R. A. and the Federal Trade Commission's trade-practice conferences, "the problem of much-needed industrial coöperation has not been solved." The F. T. C. offers little hope, since it lost the confidence of business men by its arbitrary mutilation of accepted rules in 1930 and 1931. Furthermore, it has been asked by the secretary of the interior to prosecute for supposed collusion bidders who have offered to supply the government with standardized goods at identical prices, and has not, on that account, increased the confidence of industries striving to coöperate.

The speaker expressed the fear that more "hastily-drawn, ill-considered legislative enactments and administrative policies" constitute an even greater danger than the continuance of existing conditions. Industry should survey the conditions surrounding its existence and draft proposals to offset the reports that will be supplied to the Ways and Means Committee of the House and the Finance Committee of the Senate by the N. R. A. He urged the advisability of industry's forming some new agency to "formulate and present to the Congress concrete proposals for future permissible coöperation." Among matters that should be handled in that way he named pricing first. He considers it lawful for industry to follow the open-price policy, in spite of the difficulties, and pointed out the danger of standardized prices resulting from, or appearing to result from, the coöperative exchange of price information, as such action might become illegal if shown to be collusory. "The most that industry can safely hope for without submitting to government control of prices or confiscation of so-called 'excess' earnings," he said, "is approval of the open-price system with provision for the withdrawal of such approval in case of abuse." Destructive price-cutting calculated to upset the plan might be made unlawful, Mr. Myers thinks. If the rules were legalized, they might be embodied in contracts carrying enforcing provisions and liquidated-damages clauses. The responsibility for policing its members would rest, therefore, on the industry itself.

Mr. Myers is doubtful of Congress' authority to regulate labor relations surrounding the production of commodities within the states, and says it is unlikely that Congress can decree the closed shop and other planks of the labor platform.

The author expressed his preference for legislation along the lines of the Nye bill, "granting specific authority for a procedure comparable to the trade-practice conference procedure, the law to be administered by the Federal Trade Commission or other appropriate agency." He believes this is the only way by which industry can obtain any degree of Federal sanction for its coöperative efforts "without yielding too much in the way of government control." "If only business men would exhibit the patience and self-discipline necessary fully to explore the possibilities of coöperation through the instrumentality of their trade associations," he concluded, "there would be little demand for government sanction of and participation in their activities."

MUCH of the Wednesday afternoon session was given over to the report of the Committee on Resolutions, presented by the chairman of that committee, Robert J. Potts, Potts-Moore Gravel Co., Waco, Tex. Printed copies of the report were available at the meeting. As explained by Mr. Potts, the report considered the provisions of new statutes and pending legislation directly affecting the mineral-aggregates industries.

The report first took up the Walsh Bill, which would restore the wage and hour provisions of all Codes of Fair Competition as in effect at the time of the Schechter decision by the Supreme Court; the O'Mahoney Bill, now awaiting consideration in the Senate, which requires the Federal licensing of all corporations engaged in interstate commerce, at the same time limiting surpluses with earnings in excess of 10 per cent. reverting to employees; the Black-Connery Bill which has as its principal provision the 30-hr. week; and the Shannon-Clark Bill which requires establishment of a cost-accounting system when materials are produced for agencies of the Federal government.

Two existing Federal statutes, the Wagner-Connery Act under which employees are granted the right of collective bargaining under the protective wings of the National Labor Relations Board, and the Social Security Act were also discussed in some detail.

New legislation to replace the N. R. A, the question of voluntary codes, and ways and means of liberalizing the anti-trust laws were also touched upon.

Activities of the P. W. A. and W. P. A.—past, present and future—were reviewed briefly, as was the Federal policy with regard to home-building and the Federal-Aid highway program. The continued diversion of gasoline-tax and vehicle-license receipts to uses other than road building was scathingly denounced. Compensation-insurance laws were touched upon briefly and an unreasonable degree of government regulation of the railroads was cited as definitely hampering recovery in that important industry.

Unfair competition from two sources—(1) prison labor and (2) the Federal government—were held to be highly destructive to the mineral-aggregates industries.

The following action, in the form of resolutions, was taken by the Institute regarding the above-mentioned matters:

1. To oppose any proposals for Federal legislation controling wages and hours. Specific opposition directed at the passage of the Walsh (government-contract) Bill, the O'Mahoney (licensing and profit-sharing) Bill, and the Black Connery (30-hour) Bill.

2. While refraining from comment on the principle of collective bargaining, the institute believes the Wagner-Connery (labor-disputes) Act is unjustifiable legislation, harmful in effect upon employer and employee alike, and recommends its re-

peal in the general interest of industrial harmony.

3. Recommends that support be given to all legislation which will tend to perfect the actuarial and other features of the Social Security Act, simplify and make workable its administration, and lighten, so far as possible, the burden of cost consistent with the attainment of the objectives of the act.

4. Recommends support of legislation relating to industrial regulation such as would offer industry a reasonable opportunity for that degree of self-regulation which any industry might decide of its own initiative to embrace, and that opposition be expressed to Federal legislation which purports to control industry in any manner or to impose obligatory codification of an industry without its freely-given consent.

5. To the fullest possible extent, government-financed works programs should be carried out through fixed-price contracts awarded by competitive bidding for the completed projects to the lowest responsible bidder. Mass purchasing of different materials by the government under one purchase order should be discontinued.

6. Endorses and supports such policies as seek to attain a full revival of home building, a reduction in the number of government agencies concerned with such revival, and a clarified policy and procedure.

7. Recommends a return of highway financing to states, counties and cities, where it properly belongs, with the continuance of Federal Aid to state highway departments, supplemented by such additional funds as may be warranted by emergency relief, all to be administered through the U. S. Bureau of Public Roads.

8. Condemns the diversion of highway funds from the purposes for which they are properly intended.

9. Recommends a study and investigation by the Institute of the subject of compensation insurance laws, with particular reference to coverage of occupational diseases.

10. Recommends support of measures intended to diminish and to rationalize government regulation of the railroads.

11. Records its opposition to competition with private industry by products of prison labor, and seeks to bring to the attention of state authorities such conditions as now exist, urging that every possible influence be brought to bear to correct the evil.

12. Procure and assemble all available data regarding the destructive effect of the intrusion of governmental agencies into the mineral-aggregates industries, and to use every proper and feasible means to secure the relief from government competition to which the industries are rightfully entitled.

In a paper entitled *The Significance of Social Security and Labor Legislation* John C. Gall, associate counsel of the National Assn. of Manufacturers, Washington, D. C., discussed some of the legislation dealt with by the Committee on Resolutions. Mr. Gall expressed the opinion that the Social Security Act as passed is unconstitutional. He declared that a tax on pay-rolls will be a direct stimulant to substituting machinery for men, creating even greater unemployment than might otherwise exist in normal times.

With regard to labor legislation, Mr. Gall pointed out that regulation of labor and hours, except for women and children and for adult males in hazardous occupations, is not a Federal or state power.

In the brief discussion following Mr. Gall's paper, the speaker said, in his opinion, the constitutionality of the Walsh Bill was questionable, but its provisions could probably be sustained if repassed in a modified form should the Supereme Court rule it out.

The address by Col. W. T. Chevalier, vice-president, McGraw-Hill Co., New York, N. Y., scheduled for the afternoon was deferred until after the banquet in the evening. Col. Chevalier cited the responsibilities of industry in sustaining the revival of construction and his convincing and brilliant address proved fully as enjoyable as did the dinner, the entertainment, and the dancing which followed.

Sand-and-Gravel Production Rises

The total sand and gravel reported as sold or used by 1,925 commercial producers in the United States in 1934 amounted to 75,322,909 short tons valued at $48,364,767, an increase of 13.9 per cent. in quantity and 6.7 per cent. in average value per ton compared with 1933. In addition, production of sand and gravel from about 400 state, county, and municipal operations was reported to the Bureaus of Mines; this material totaled 41,288,780 short tons valued $12,882,406, decreases of 0.9 per cent. in tonnage and 6.1 per cent. in average value per ton compared with 1933. The total output of sand and gravel accounted for in the canvas by the Bureau of Mines was therefore 116,611,689 short tons valued at $61,247,173.

Total production by commercial operations was virtually identical with the preliminary figure released early in 1934. The output of noncommercial operations, however, was greater than preliminary data indicated and total production for the year exceeded the preliminary figure by 3 per cent.

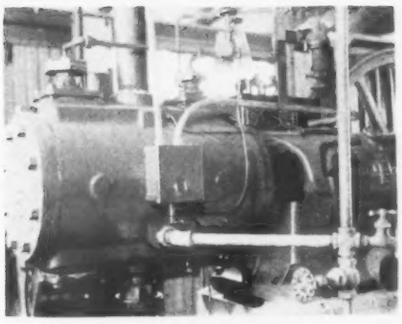
Although a smaller number of schedules were returned from noncommercial operations in 1934 than in 1933 the output of this material was about the same in the two years. The decline in number of returns was due in part to a trend toward consolidating individual county reports with State reports.

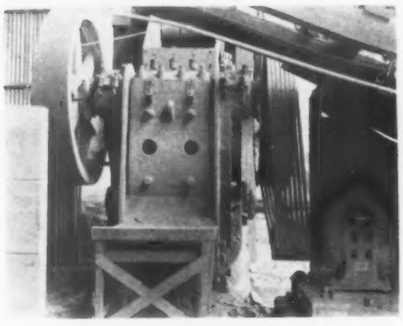
As in previous years only a small part (23 per cent.) of the sand and gravel produced by noncommercial operations in 1934 was washed, screened, or otherwise prepared to make it comparable in quality with the output of the average commercial plants.

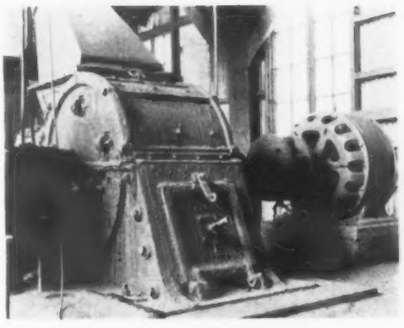
Additional data regarding the output of noncommercial operations were collected for the year 1934. Noncommercial production included 20,314,296 short tons valued at 22c a ton produced directly by construction and maintenance crews of States, counties, municipalities, and other government agencies and 20,974,484 tons valued at 40c a ton produced by contractors expressly for the use of these agencies.

CALIFORNIA PRODUCER OF ASPHALTIC ROCK CREATES NEW MARKETS FOR PLANT'S OUTPUT

By W. E. TRAUFFER







Top: Air compressor which operates quarry drills. *Center:* Roll-jaw type primary crusher. *Bottom:* Hammer-mill used for final reduction.

THE CALROCK ASPHALT CO., of San Francisco, Cal., pioneer producer of rock asphalt on the Pacific Coast, has made many important developments since its operations were completely described in the December 16, 1931, issue of PIT AND QUARRY. Its plant at Santa Cruz, Cal., was completed in October, 1930, and remains essentially unchanged. Major changes have, however, been made in the quarrying of the material and in its handling at the plant. Much has also been done in developing new outlets and uses for this product.

The bituminous sandstone deposits outcrop at various points on the hillside above the plant and several quarries were opened at these points. These quarries were later abandoned because the overburden became too heavy or for other reasons. The quarry now in operation was opened late in 1932 after thorough prospecting had assured the economical availability of large quantities of material. This quarry is at the top of a range of hills 500 ft. in elevation above the plant and one mile distant by road. The overburden on this deposit averages 12 to 15 ft. in depth and is mostly loam and shale, which was removed with a Caterpillar tractor and a scraper.

The ledge of material varies from 30 to 45 ft. in thickness and has a bitumen content of from 8 to 14 per cent. with an average of 11 to 12 per cent. Drilling is done with Ingersoll-Rand and Gardner-Denver jackhammers of the wet type using Timken detachable drill bits which are not now being resharpened. According to R. A. Harker, plant superintendent, these bits have effected a large saving for the company, as drill steel formerly was hauled many miles to be resharpened. These bits have the water opening at the side instead of the bottom to prevent plugging.

Loading trucks by hand at quarry of Calrock Asphalt Co., Santa Cruz, Cal.

Drill holes were formerly sprung at the bottom with black powder before shooting but a more effective method has since been developed. Holes are now drilled 6 ft. apart in a single row and blown clean with air after drilling. Giant Special Quarry 70 in bags and 1½-in. by 8-in. sticks of Giant 40-per cent. special gelatin are used. The load distribution has been so efficiently worked out that the explosives cost has been brought down to less than 8c. per ton. Blockholing is done with the same drills.

A recent installation is a new Gardner-Denver Model YC air compressor housed in a building near the quarry. This unit is driven through Dayton Cog-Belt by a 40-hp. General Electric motor and supplies air at 125-lb. pressure. The compressor is equipped with a Sullivan air lift which pumps cooling water from the cylinder jacket to a 300-gal. tank from which it returns by gravity. When only once drill is in use in the quarry, a General Electric automatic pressure switch shuts off the compressor motor when the correct pressure is reached and starts it again when the pressure drops below a certain level. When running two drills, a Chicago Pneumatic unloader is used to prevent heating due to the constant starting and stopping. This device releases the intake valves when the proper pressure

is reached and allows the compressor to run against atmosphere. When the pressure drops 20 lb. it again picks up.

A steam shovel was tried in this quarry for loading but its use had to be abandoned as a proper selection of rock could not be made. Hand loading in this deposit has been found more satisfactory as a considerable amount of the leaner rock is wasted. Six 4-cu. yd. White trucks and an Autocar are used for haulage to the plant. This haul is downgrade for the entire distance to the plant and the return trip upgrade is made empty. This contributes considerably to the economy of the operation.

The trucks discharge in the same manner as formerly from a ramp to the plant feed-hopper. A pan conveyor feeds the material to the 18-in. by 32-in. roll-jaw type primary crusher whose product is taken to the stock-pile storage on an inclined belt-conveyor. A new Clyde Wiley whirley rehandles the material and distributes it in layers over the stock-piling area. By reclaiming from storage in cross cuts additional blending is obtained. The total stock-pile capacity is about 10,000 tons.

The Clyde Wiley whirley was put in operation in May, 1934, and is of improved design. It is equipped with a 75-ft. boom and handles a 1¼-cu. yd. Blaw-Knox Dreadnaught clam-shell bucket. The unit is mounted on reinforced-concrete foundations and has anti-friction turntable rolls. A 35-hp. General Electric motor is used for rotation and a 75-hp. Westinghouse motor operates the boom and bucket.

The whirley handles material from the stock-pile to a 200-ton bin, from which a feeder and belt-conveyor supply the plant. The conveyor to the stock-pile formerly discharged direct to this bin. The only other change in the plant flow was the removal of a set of crushing rolls. The final reduction is now obtained with a Williams Jumbo, Jr. hammer-mill which receives material over ⅜-in. in size from a 42-in. by 60-in. single-deck Robins Vibrex screen. The product of the crusher is fed back to the screen. The minus ⅜-in. material goes to the mixer building where bitumen is added to bring it to the desired 14 to 15 per cent. content. When material is to be stored for any length of time 1 per cent. of diatomaceous earth is added at the pug-mill. This not only retards the set, but has also been found to give a better pavement finish.

Material is shipped by railway or truck as formerly. When shipments are made for the San Francisco Bay region no bitumen is added. A plant has been leased in Melrose, a suburb of Oakland, where rock asphalt is stored until ordered. The necessary bitumen is added at this plant so that fresh-mixed material can be delivered in the East Bay area.

The company has been working for years on industrial by-products and in September of last year put on the market a cold mastic tile for industrial floors and for roofs. The tile is formed under a pressure exceeding 5,000 lb. per sq. in. and has a final composition of 79 per cent. silica-sand aggregate, 7 per cent. mineral filler and 14 per cent. bitumen, of which 1.5 per cent. is flux. The size of the standard tile is 4¾ in. by 9½ in. with a thickness of 1 in.

Whirley which distributes rock asphalt to storage and reclaims from storage in a rough blend to the plant feed bin at right.

which can be varied on special order. Limestone filler is ordinarily used, but where resistance to acids is desired a silica filler is used.

The company states that this Calrock mastic tile can be used wherever a high-grade heavy industrial mastic flooring is desired. Typical installations are on ramps, loading platforms, walks, basement floors where dampness is present, etc. A considerable field also exists in the paving of roof decks over a waterproofing membrane. This tile can be laid over any sound base such as concrete or wood. An asphalt paint coat is applied and the tile imbedded in it with close joints. Rolling with a heavy hand roller is recommended to obtain uniform and complete embedment and to seal the joints between the tile.

The surface can be left as laid or finished in a number of different ways. The untreated surface possesses a pleasing soft appearance which is highly non-skid and rather gritty. These tiles are malleable and self-healing at all atmospheric temperatures from freezing up. They are guaranteed to be thoroughly stable under heavy wheel loads and concentrations at the highest temperatures experienced and will not shove, rut, corrugate, bleed or become sticky. The tractive resistance is extremely low even when first laid. Other features claimed are: a smooth and dustless surface; high resistance to abrasion; imperviousness to water and moisture. This type of flooring is said to be warm and comfortable under foot and its resilience makes it less tiring to workmen than harder types of floors. The company is also prepared to contract for the complete installation of these tiles at any place in California.

A cold-laid mastic flooring with characteristics similar to the tile has also been developed. This material is finely pulverized and is shipped in sacks. It requires no gypsum or cement and only small quantities of asphalt emulsion in placing. It is mixed with emulsion and water and applied with a trowel. When dry it is rolled and is ready for use within 4 to 8 days. This flooring is designed for lighter traffic than the tile and can also be used as a base for the tile.

DETROIT PLANT USES CRUSHED SLAG TO MAKE STABILIZED ROAD MIXTURE

UTILIZING principles of soil stabilization[1] the Road Materials Co., Detroit, Mich., contractor, recently constructed and placed in operation a mixing plant to produce stabilized blast-furnace slag for road-surface and base-course construction. The first unit of its kind in the country, the plant processes the clay used as soil binder and mixes the pulverized clay with slag screenings and calcium chloride in controlled proportions to produe a stabilized slag mixture.

Operations were begun on an original order for 25,000 tons of the stabilized material for base-course construction on Detroit city streets. The plant has a capacity of 100 tons an hr., and production has gone ahead steadily ever since the plant started. The material is delivered to the road by the contractor, ready to be spread and compacted. Welfare labor is being used by the city in the preparation of the base and in spreading and shaping the ready-mixed material.

Machinery for the mixing plant, which consists of a system of feed hoppers, belt-conveyors, a clay-processing unit, and pug-mill, was obtained largely from an abandoned brick plant which formerly occupied the same site. The only entirely new unit required for the mixing plant was a screw feeder to force-feed the clay. All the other parts were constructed from machinery available in the contractors' yards. The plant has been in operation since early in December of 1935, and while several minor improvements have been made from time to time, it is operating successfully practically as originally designed.

Located on the outskirts of the city, the plant has an abundance of clay available close at hand. Slag screenings, obtained from steel plants, are brought to the plant in large trucks. Flake calcium chloride and water are the only other ingredients of the final mixture.

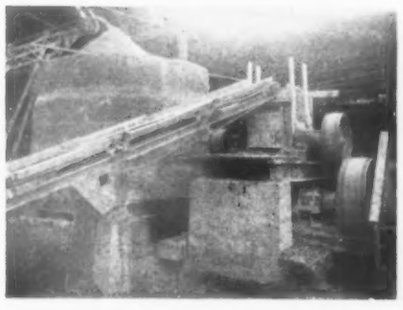
The slag, classed as fines, coming to the plant is dumped directly from the truck into a pit from which it is elevated to the slag feed-hopper by a belt-conveyor. From the feed-hopper the slag passes through a gate which regulates the flow and, hence, the amount of material going into the mix. As the slag is suitably graded as received, it requires no

[1]See *Stabilized Surfacing of U. S. Highways to Open Up Large New Industry* by Ray A. Giddings, in PIT AND QUARRY, January, 1936, pp. 89-90.

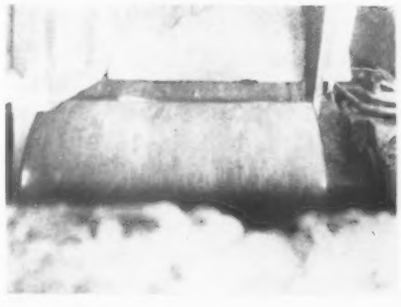
Belt-conveyor which elevates slag to storage-feed hopper.

Bank-run clay is received from dump trucks which unload into the clay hopper.

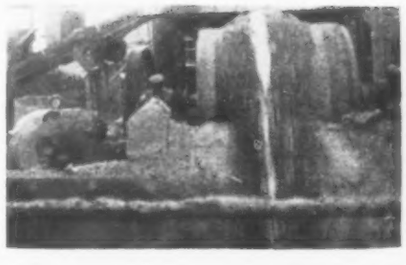
Screw feeder below clay hopper force-feeds and controls clay going into mixture.



Belt-conveyor discharging slag into clay disintegrator.

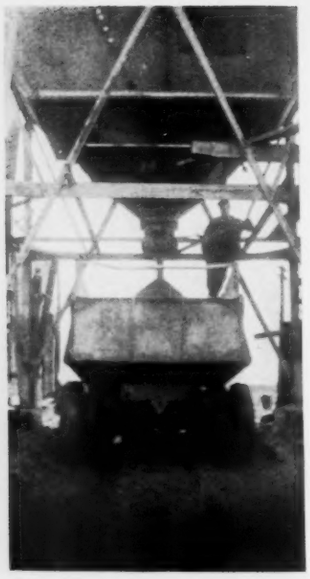


Second and lower set of rolls which completes crushing of clay just before it is discharged to belt.



Main conveyor discharging clay-slag-calcium chloride mixture into the pug-mill.

From the pug-mill the finished mixture is raised to the loading bin by a bucket-elevator.



From the loading bin the stabilized slag is chuted to trucks and hauled to the road.

special handling except a controlled feed. It could, therefore, be fed directly from the unloading pit to the main conveyor belt, but, in this case, the arrangement of the plant makes the use of the intermediate feed-hopper advisable. This hopper serves as a storage-bin and assures a steady feed through the control gate.

Clay for the mixture is obtained from the near clay bank and is hauled to the plant by the truckload. One truck is sufficient for this operation. The truck is backed up a ramp and dumps directly into the clay hopper superimposed on the screw feeder. When the clay is wet, some hand labor is required in the unloading and to assure a steady feed.

The screw feed at the bottom of the hopper regulates the amount of clay going into the mixture. It forces the clay to a conveyor belt leading to the clay-pulverizing unit, thus making it possible to use the clay as it comes from the pit. It also exerts a shredding action, and provides the first disintegrating effect on the clay lumps.

From the screw feed the clay passes to the disintegrating and crusher unit. Two sets of rolls, one above the other, form this unit. The first set consists of one large smooth-faced roll operating at slow speed, and another smaller roll having cutting knives set into its face and operating at high speed. The difference in the speed and the size of the rolls produces a grinding effect which is additive to the cutting action of the flanges on the small roll. The rolls in the second and lower set are the same size and rotate at the same speed. Set close together, with only a fraction of an inch clearance, this set of rolls crushes any lumps which escape the first set. When the clay is extremely wet, however, the second set of rolls is sometimes withdrawn as it has a tendency to cancel the effect of the first set by "pancaking" the wet particles already shredded.

From the disintegrator unit the clay falls directly on the main conveyor belt on the top of the slag which has already been fed to this belt from the storage hopper. When dry, the clay is reduced to powder and small flakes. When wet, it comes out in thin strips, but in either case is sufficiently well crushed to be mixed thoroughly with the slag in the pug-mill.

Above the main conveyor belt, between the disintegrator unit and the pug-mill, is a calcium-chloride hopper. A plate, having holes of different sizes and placed at the bottom of the hopper, regulates the flow of the calcium chloride, which falls on the belt to join the clay and slag.

The main conveyor belt empties into a pug-mill, or paddle-type conveyor, which is approximately 3 ft. deep and 12 ft. long. The paddles in this mill thoroughly mix the various ingredients and move the material the length of the mill, emptying it into a bucket-conveyor, which elevates the finished mix to a storage bin from which it is chuted directly into the delivery trucks.

A small amount of water is added to the mixture from a sprinkler pipe feeding into the pug-mill. Only enough water is added to prevent the segregation of the materials in handling and to facilitate compaction on the road. The amount used varies according to the moisture content of the clay and the condition of the base on which the material is to be placed.

Specifications on the original order call for a gradation of the final mixture as follows:

Passing ¾-in. screen	100 per cent.
Passing ½-in. screen	60–90 per cent.
Passing No. 10 screen	35–50 per cent.
Passing No. 40 screen	20–40 per cent.
Passing No. 200 screen	5–10 per cent.

The finished mixture is also required to have a plasticity index of from 8 to 11, as determined by the physical soils tests of the U. S. Bureau of Public Roads. This requires the addition of approximately 12 per cent. of clay by weight. Calcium chloride is added at the rate of 10 lb. per cu.yd.

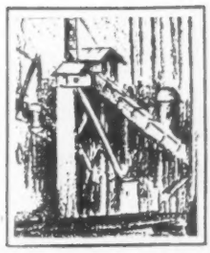
The mixture is designed to provide a wearing course having a maximum density and all-weather stability. Hauled to the street by the truckload, it is spread and shaped with a blade almost immediately and is allowed to become compact under traffic. On the Detroit streets, where the material is now being used, it is spread in 2-in. layers to form a 4-in. compacted mat. Experience with the streets already surfaced by this method shows that the mixture compacts readily and attains a high density within a few days.

Plant mixing of this material, as accomplished by this plant, has numerous advantages over road mix methods. These may be enumerated as: (1) less dependence on weather conditions, (2) less interference with traffic, (3) more uniform mixture, and (4) less equipment required on the road. Plant mixing also reduces the number of soils tests required, since with the source of supply more constant, once the soils analysis has been determined and the mixture designed production can go ahead almost indefinitely with only occasional check tests. These advantages, readily apparent to the road engineer, in addition to favorably comparable cost, indicate the market possibilities for the material.

MEN of the INDUSTRY

NORMAN G. HOUGH

IN 1913 Mr. Hough took his first job in the lime industry as a salesman for the Kelley Island Lime & Transport Co., Cleveland, O. Now, 23 years later, he has left his post as president and general manager of the National Lime Assn. to return to the Kelley Island firm, this time as general sales manager. In the interim, besides serving the association for more than nine years, he has held executive positions with the Pittsburgh Hydrated Lime Bureau, the American Cement Plaster Co., and the Universal Gypsum & Lime Co. He was with the last-named concern for a period of six years, rising from district sales manager to general sales manager, and then to vice-president. He is 50 years old and a native of Buffalo, N. Y.



Personal Mention

Charles F. Connelly, formerly secretary-treasurer of the Terre Haute Gravel Co., Terre Haute, Ind., has been named president following the recent death of George J. Nattkemper, who had been head of the company for a number of years.

Paul R. Anderson of the Arrow Sand & Gravel Co., Columbus, O., was elected president of the Builders & Traders Exchange of Columbus at the annual meeting of the organization held January 6 at the Exchange's headquarters in Southern Hotel.

E. D. Gubernator, executive officer of the Lehigh Portland Cement Co., is a member of the National Committee for Study of Land Transportation Coördination, which held its initial meeting at Washington, D. C., on January 6. The aim of the committee is to harmonize conflicting viewpoints between rail and trucking interests and to plan a course of future action.

Howard S. Johnson, vice-president of the American Hoist & Derrick Co., has retired from active service with the company. His place on the board of directors has been filled by **R. E. Ljungkull,** chief engineer.

William C. Davis, formerly connected with the United States Gypsum Co., has been appointed director of merchandising for the new industrial- and structural-materials division of the Owens-Illinois Glass Co.

James Roche, 47, an employee of the plaster plant of the Atlantic Gypsum Products Co. at 150th St. and the East River, New York, N. Y., suffered a fractured skull recently when he fell into a calcining kettle. He was adjusting a cover on the kettle when the accident occurred.

T. A. Davies of Seattle, Wash., has succeeded Henry M. Brooks of New York, N. Y., as president of the Pacific Coast Co., the holding company which controls the Pacific Coast Cement Co. and other West Coast corporations. Mr. Davies' election transfers management of the affairs of the company to the Pacific Northwest. **N. D. Moore** was re-elected vice-president and general manager. Mr. Moore will continue to be active in directing the affairs of the cement company, it is said.

Charles L. Cruikshank has been appointed manager of the ceramic department of the Great Lakes Foundry Sand Co., Detroit, Mich. Mr. Cruikshank, a graduate of the University of Michigan, has been interested in the nonmetallic-minerals industry for several years and will be actively engaged in the sale of "nepheline syenite," a new ceramic raw material.

Jerome E. Sweet and **Richard M. Smith** have joined the sales and engineering staff of the Claude B. Schneible Co., dust arrester engineers, Chicago. Mr. Sweet, formerly in a sales position with the American Foundry Equipment Co., will work as sales engineer and Mr. Smith, formerly with the Dodge Mfg. Co., will fill the position of field engineer.

John Buchanan, employed as a repairman at the plant of the Albany Sand & Gravel Co., Albany, N. Y., suffered a fractured leg a few weeks ago when he fell from a trestle at the plant.

H. S. Colby, general sales manager of the Combustion Engineering Co., Inc., announces the appointment of **Otto de Lorenzi** as assistant general sales manager. Except for two years in the A. E. F., Mr. de Lorenzi has been with the company since 1916 in various engineering capacities. He is a graduate of Cornell, a member of the A. S. M. E., and a licensed professional engineer.

Don S. Walker has been appointed district manager in the Philadelphia office of Combustion Engineering Co., Inc., according to an announcement by H. S. Colby, general sales manager. Mr. Walker will be responsible for sales in Philadelphia and Washington territories. His career started in 1919, and he has been associated with D. H. Skeen & Co., Chicago, Mercon Regulator Co., Illinois Barge Line Co., and John I. Hay Co., joining Combustion Engrg. Co. in December, 1934.

R. L. Mead.

R. L. Mead has been appointed manager of the Chicago office of the Harnischfeger Corp., located at 20 North Wacker Drive. Well known through his 15 years of activity in the field of material-handling equipment, Mr. Mead, since 1921, or for six years, was with the Industrial Brownhoist Co. Subsequently, he was with The Ohio Locomotive Crane Co., McMyler Interstate Co., and most recently he was with the Link Belt Co. as district sales manager.

Coming Events

February 14-23, 1936. Detroit, Mich.—Detroit Builders' and Manufacturers' Exhibition.

February 17-21, 1936. New York, N. Y.—The 145th annual meeting, American Institute of Mining and Metallurgical Engineers, Engineering Societies Bldg., 29 W. 39th St.

February 25-27, 1936. Chicago, Ill.—American Concrete Institute, Palmer House. Harvey Whipple, sec., 642 New Center Bldg., Detroit, Mich.

February 25-28, 1936. Wichita, Kans.—Ninth Annual Southwest Road Show and School, Exposition Bldg.

March 23-April 4, 1936. New York, N. Y.—Greater New York Building Exposition, Port Authority Bldg.

April 20-24, 1936. Chicago, Ill.—Midwest Engineering and Power Exposition. G. E. Pfisterer, sec., 1 N. La Salle St., Chicago, Ill.

E. W. Dienhart, housing engineer with the Portland Cement Assn., was the principal speaker at a conference held at the Hammond, Ind. Chamber of Commerce in January. Mr. Dienhart presented cost figures on many of the concrete homes built throughout the country in recent months.

Thomas A. Butt, stockholder and director in the Smoot Sand & Gravel Co. and the Richmond Sand & Gravel Co., both of Washington, D. C., has been chosen a director of the National Savings & Trust Co. of Washington.

Walter V. Cranford, president of the Cranford Material Corp., Brooklyn, N. Y., commercial producer of pre-mixed concrete, died in December at his home in Greenwich, Conn. He was also head of Cranford Co., an engineering organization.

John R. Stern, 52, superintendent of the Detroit, Mich., plant of the Peerless Cement Co., died at his home of heart disease following an illness of only three days.

Irwin S. Osborn, vice-president of the C. O. Bartlett & Snow Co., equipment manufacturers, died recently at Cleveland, O. He was 56 years old.

Harry L. Horning, 55, president and founder of the Waukesha Motors Co., Waukesha, Wis., died Jan. 4 in a sanitarium at Battle Creek, Mich. Mr. Hornung was a past president of the Motor and Equipment Manufacturers Assn., and during the war served as chairman of the automotive section of the War Industries Board.

George E. Lary, 80, retired official of the Bedford Stone Co., Bedford, Ind., died Dec. 3 of heart disease, aggravated by kidney trouble. He had been active in the Indiana limestone industry for more than a quarter century.

William MacGregor, 47, general sales manager of the Carborundum Co., Niagara Falls, N. Y., died after a long illness at the Polyclinic Hospital, New York. He joined the sales staff of the company in 1912 and six years later became sales manager of the stone and marble, and the paper and cloth departments, with headquarters at Niagara Falls. He was made general sales manager of the company in 1926.

Willard N. Sawyer, 73, formerly president of the Wellman Engineering Co., died Jan. 5, 1936, at his home in Kent, O. Mr. Sawyer became president of the Wellman company in 1907, holding the post for eleven years. He had retired in 1927.

J. G. Obermier, vice-president of the Timken Roller Bearing Co., died recently at Tucson, Ariz.

John Cooper, 46, employed in the Haverstraw, N. Y., plant of the New York Trap Rock Corp., met his death Jan. 10 when he became caught in a revolving screen. It was the first fatality at the plant in two years.

C. Harry Rogers, 67, president of the National Building Granite Quarries Assn., died January 12 at his native Rockport, Mass. Mr. Rogers joined the Rockport Granite Co. in 1892 and at various times was its president, treasurer, and assistant treasurer.

. . . . . Traffic News and Comment . . . . .

Recent I. C. C. Decisions

Cement—In response to fourth section application No. 15,984 the Commission has authorized carriers who are parties to Curlett's I.C.C. No. A-211 to establish and maintain a rate of $6.30 a net ton plus emergency charge from Martinsburg, W. Va., to Miami, Fla., via all rail routes on hydraulic, natural or Portland cement, C. L. minimum weight 60,000 lb. and to maintain higher rates from and to intermediate points subject to a 33⅓ per cent. circuity limits. The rates from and to higher rated intermediate points are not to exceed rates constructed on the basis procured in Southern Cement, 132 I.C.C. 427. I.C.C. F.S.O. 12,157.

Crushed Stone—On further hearing the Commission has amended the prior report in 200 I.C.C. 65 in which the rates on crushed stone, grout, riprap and other quarry waste and on rubble from West Chelmsford, Mass., and South Milford, N. H., to destinations in trunk line and New England territories were found unreasonable. The Commission has now found that the rates on crushed stone, grout and riprap from West Chelmsford and South Milford to destinations in trunk line and New England territories are and in the future will be unreasonable to the extent they exceed or many exceed the scale shown in the report. This scale applies on a c.l. minimum weight of 80,000 lb. for single line movement. For joint movement an addition of 20 c. a ton is allowed and an addition of 70 c. is allowed for car float or lighterage service in the New York Harbor district where such service is necessary. Representative mileage and rates on this scale are:

Miles	*Rate*
15	$0.65
40	1.00
80	1.20
175	1.65
380	2.55
470	2.90
560	3.15

In a dissenting opinion Commissioner McManany objected to the elimination of rubble from the quarry waste group as he said this elimination put rubble in the paving group at an increase of a hundred percent in rates in New England and slightly more than a hundred percent from southern points to New England and official territory. I.C.C. Docket No. 23,683, H. E. Fletcher Co., et al v. B. & M. et al and I. and S. No. 4,043, rubble stone from southern to northern points.

Crushed Stone, Sand and Gravel—The Commission has found not justified proposed schedules of southern carriers designed to revise the emergency charges on crushed stone, sand, gravel and slag moving interstate within southern territory where the basic rate is $1.00 per ton or less. The suspended schedules have been ordered to be cancelled without prejudice to the filing of new ones in conformity with the views expressed in the report. At the hearing in Emergency Charges 1935 reported in 208 I.C.C. 4 southern carriers proposed a flat emergency surcharge of 5 c. per ton which proposal was rejected by the Commission. Immediately following the decision a number of producers, most of whom are located in Alabama, petitioned the Commission to substitute the flat 5 c. surcharge for the basis prescribed in its order. On denial of the petition, the producers applied to the District Court of northern Alabama for an injunction forbidding the carriers to establish the authorized emergency charges. This application was denied. In the present case the carriers published schedules proposed to put the flat 5 c. basis into effect. They contended that the surcharge on all rates in excess of a dollar which surcharges amounted to from 7 c. to 20 c. increased the rates to such an extent that the traffic would not move. The Commission has found the proposed 5 c. emergency charge justified on the rates which are more than a dollar. On the rates ranging from 61 c. to a dollar the proposed 5 c. charge would result in some increases and, as the evidence suggested that the average rail haul on the commodities, excluding slag, was somewhere between 30 and 60 miles or well within range of an economical truck operation, the proposed increase would probably drive more of the traffic from the rails to the trucks or to a non-commercial production of these commodities. During the depression a large number of contractors and builders have resorted to the use of portable stone crushers to process native stone instead of buying the commercial stone from the producers. I.C.C.I. and S. Docket No. 4,150, emergency charges on sand and gravel in the South.

Sand and Gravel—A third supplemental report on reconsideration, previous reports in 155 I.C.C. 247 and 177 I.C.C. 621 have been amended by eliminating Harahan, Louisiana and substituting East Bridge Junction, Louisiana in lieu thereof. This is on account of car ferry service between Harahan and Avondale, Louisiana, having been discontinued, the traffic now moving across the bridge between East Bridge Junction and West Bridge Junction. I.C.C. Docket No. 47,000 Part 11, sand and gravel within the Southwest.

Emergency Charges in Georgia—The Georgia intrastate rates which do not carry emergency charges because the state commission would not allow the emergency charges to become effective have been found to result in unjust discrimination against interstate commerce on all classes and commodities except crushed stone, sand, gravel and related articles. Unless the Georgia Commission notifies the Interstate Commerce Commission on or before January 25 that it would permit the emergency charges to become effective, the Commission stated that an order would be entered requiring the removal of the discrimination.

Examiners' Reports

Agricultural Limestone—Examiner L. J. P. Fitzthorn proposes that the Commission award reparation on finding that the rate on agricultural limestone from Bluffton, Ind., to Holder, Brokaw, Padua, Arrowsmith, Saybrook, Ellsworth and Durbey, Illinois, was unreasonable on shipments made between March 14 and April 17, 1934, to the extent it exceeded $1.11 a net ton. I.C.C. Docket No. 27,184, Erie Stone Co. v. N. Y. C. and St. L.

Lime—Examiner R. L. Shanafelt recommends that the Commission find the rates on lime, common, hydrated, quick or slaked from Gibsonburg, Woodville and Cold Springs, O., to all destinations in southern territories unreasonable for the future but that these rates, and specifically the rates from Gibsonburg to Laurens, South Carolina and Chattanooga, Tennessee, be found not unreasonable in the past. Examiner Fitzthorn proposes that reasonable rates be based on a mileage scale to apply on a c.l. minimum weight of 30,000 pounds with arbitraries to be added on traffic into the Florida peninsula. Representative rates in the proposed mileage scale are:

Miles	*Rate*
90- 100	$2.40
180- 200	2.90
280- 300	3.40
380- 400	3.90
480- 500	4.40
775- 800	5.60
1050-1100	6.50
1350-1400	7.40

The arbitraries to be added for shipments into the Florida peninsula cover destinations from up to 500 miles. Representative rates on the arbitrary scale are:

Miles	*Arbitrary*
0- 5	$0.19
90-100	.60
280-300	.85
400-500	1.10

I.C.C. Dockets No. 26,937, National Mortar & Supply Co. v. Pennsylvania, et al; No. 27,008, Laurens Glass Works, Inc. v. C. & W. C. et al; and No. 27,012, Chattanooga Glass Co. v. Pennsylvania et al.

New Complaints Filed

Reparation and new rates are sought on sand from Ottawa, Illinois to Cleveland, O., in a complaint charging unreasonable rates filed by L. V. Brandt, Stationery Mart Bldg., Chicago Ill., in I.C.C. Docket No. 27,263, Cleveland Twist Drill Co., Cleveland, O. v. C. B. & Q. et al.

In a complaint charging unreasonable rates on sand from Wedron, Illinois and Mapleton, Pa., to Newark, O., new rates and reparation are sought. The complaint was filed by L. V. Brandt, Stationery Mart Bldg., Chicago, Ill., in I.C.C. Docket No. 27,265, A. H. Heisey and Co., Newark, O. v. C. B. & Q.

Alleging violation of Section 1 in connection with the rate on molding sand from Elnora, Ushers and Mechanicville, N. Y., to Bloomfield, N. J., reparation is sought in a complaint filed by Robert DeKroyft, T. M., 20 Washington Place, Newark, N. J., in I.C.C. Docket No. 27,268, A. P. Smith Mfg. Co., East Orange, N. J., v. D. L. & W.

Alleging violation of Section 1, reparation is sought on shipments of sand made between April 20, 1927, and June 30, 1935, from Cape May, N. J., to Manlius, N. Y., in a complaint filed by Leo Tessler, Practitioner, 1148 Manor Avenue, New York, N. Y., in I.C.C. Docket No. 27,237, S. Chaney & Son, Manlius, N. Y., v. N. Y. C. et al.

Reparation is sought and unreasonable rates alleged on molding and foundry sand from Manumuskin and Millville, N. J., to Saratoga Springs, Schuylerville and Schuyler Junction, N. Y., to Boston, Mass., in a complaint filed by Samuel H. Blank and William F. Cavanah, Practitioners, 874 Broadway, New York, N. Y., in I.C.C. Docket No. 27,278, Mechanics Iron Foundry Co., Boston, Mass., v. Pennsylvania et al.

Alleging violation of Section 1, reparation is sought on shipments of sand moving from Ottawa, Ill., to Elmira, N. Y., in a complaint filed by L. V. Brandt, 328 S. Jefferson St., Chicago, Ill., in I.C.C. Docket No. 27,280, Eclipse Machine Co., Elmira, N. Y., v. C. R. I. and P. et al.

Emergency Freight Charges—The Class I railroads have filed an application with the Commission asking it to authorize them to continue without an expiration date the emergency charges authorized in Ex Parte 115 which terminate June 30 unless the Commission authorizes their continuation or extension. As this is written no docket number has been assigned to this petition. The carriers contend that on the whole there has been little complaint from the shipping public against the payment of these charges and that they have not brought about any disturbances in business conditions and have not resulted in the loss to competing agencies of transportation of any substantial volume of traffic. That on the contrary there has been, since the date the charges were made effective, a slight upward trend in petitioners' traffic. They estimate that the emergency charges for the period from April 18 to December 1, 1935, amounted to $65,000. They claim an additional annual expense of $160,000 due to increased labor costs and other increased operating ex-

(*Continued on page 61*)

New Machinery . . . and Supplies

New Slurry Drier Unit Uses Exit Gases from Kilns

The Allis-Chalmers Mfg. Co., Milwaukee, Wis., has developed a slurry drier to be used in conjunction with wet-process cement kilns, and driven independently of the kiln. It consists of a cylinder which, in construction, is similar to the kiln itself. It is lined with refractory brick, and is filled with a mass of suspended chains so that the hot exit gases issuing from the kiln in passing through the slurry drier give up heat to the chains and to the lining as well as to the surface of the incoming slurry. The heat absorbed by the chains is transmitted to the slurry flowing through the drier, which evaporates a large part of the moisture. This evaporation is aided also by the heat which is absorbed in the lining of the drier.

In order to eliminate the difficulties due to burning out the chain by overheating, encountered in the standard kiln in which chains are used for heat recuperation, the slurry drier is equipped with a nozzle which sprays a part of the slurry onto the chains in the form of a diverging jet, thus preventing premature burning of the chains.

The moisture of the slurry which is used to cool the chains is evaporated in that part of the slurry drier wherein the temperatures are highest, or at the point where the exit gases from the kiln enter the slurry drier.

The drier is designed to cool the exit gases from the kiln to approximately 250 deg. F., and therefore requires an exhaust fan. Since so large a part of the heat is reclaimed within the slurry drier, high thermal efficiencies of the kiln slurry drier unit are obtained.

A wet-process rotary kiln equipped with an air quenching cooler for reclaiming a part of the sensible heat in the clinker and a slurry drier for reclaiming a part of the heat contained in the high temperature exit gases, produces high terminal overall efficiencies.

To facilitate the operation of the complete kiln unit, control equipment is included, operated from a switchboard on the burning platform, which enables the burner to regulate the synchronized speeds of the ferris wheel feeder, slurry drier, and the kiln, or to change the relative speeds of these three units. There are included draft gauges, damper position indicator for the slurry drier exhaust fan, gas sampling equipment, temperature recorder, tachometer indicators, production counters, radiation pyrometer, warning siren, and telephone equipment at convenient points on the kiln system.

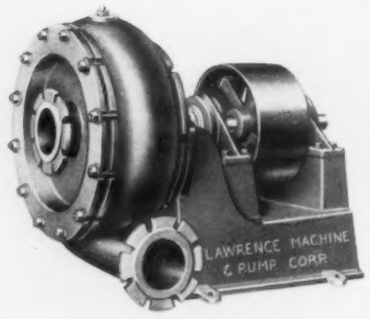
Centrifugal Dredging Pump Features Large Clearances

The Lawrence standard dredging pump, introduced recently by the Lawrence Machine & Pump Corp., Lawrence, Mass., is the result of many years of experience in hydraulic dredging on all classes of material from silt and marl to coarse gravel and boulders. It combines to the utmost the practical requirements of hydraulic dredging with modern centrifugal pump practice especially as it pertains to mechanical efficiency, speeds and methods of drive.

The requirements in a dredging pump may ordinarily be listed in the following order of importance:

1. Ability to handle large size solids without clogging.
2. Ruggedness and ability to withstand abuse and wear.
3. Low maintenance cost.
4. Low power consumption.

Careful consideration was given to all



New standard dredging pump.

of the above items in the development of the new dredging pump, resulting in a pump that shows greater output and lower unit cost for dredging of material than any other pump under like conditions.

Special attention is directed to the large clearances through the impeller and the pump. This is of particular importance when dredging mixed material where occasional large boulders, roots, etc., are bound to be encountered.

These clearances are as large as it is practical to have them for the given size of pump without incurring the danger of plugging the discharge pipe.

To resist abrasion and the severe usage that a dredging pump is subjected to in the course of its service all of the parts are made extra heavy and all shocks and friction are reduced to a minimum by a correct design of passageways through the impeller and the volute. The parts which come in contact with the material and are subjected to abrasion are furnished of whatever metal is found to be the most suitable for that particular service. For dredging clay, silt, etc., parts made of our wear resisting semi-steel are found to be economical and satisfactory. For pumping coarse gravel, manganese steel is usually found best, while for fine, sharp abrasive sand our heat treated, alloy steel gives the best results.

The wearing parts are only three in number, that is—the sheil, the impeller and the suction disc. To reduce their cost these parts are of very simple design, easy to cast and require but very little machining.

The pump can be readily dismantled for renewals and repairs, and no special tools or equipment are required. The shell is secured to the disc and to the frame with bolts through slotted flanges, requiring but a turn of the wrench to disengage them. The impeller is secured on the shaft with a tapered fit nut and key and can be taken off readily. The shaft is held in place in the bearings by locking collars and can be removed readily by loosening these collars.

Air Hose Resists Destructive Effect of Compressor Oils

A new air hose, designed especially to overcome the deteriorating effects of hot oil from air compressors, is announced by The Republic Rubber Co., Youngstown, O.

Oil is said to have no deteriorating effect on this new rubber air-hose.

The tube is made from a compound similar to that used in oil conducting hose and can actually be saturated with oil for long periods of time without affecting its serviceability.

In addition, the hose has great resistance to heat, high pressures, abrasion, the cutting effect of sharp rock and exposure to sun and weather. It is recommended for mines, quarries, rock industries, road work, contracting and general industrial use where service is exceptionally severe.

Great strength has been obtained, without impairing flexibility, by constructing the plies from a specially twisted cord which is thoroughly impregnated with a new tenacious rubber compound. This also increases the bursting and working pressures, and results in greater resistance to shock and abuse.

All construction details of the new hose have been so balanced and engineered as to result in strength without excess bulk or useless weight. Hose costs can be considerably reduced because of longer life and fewer replacements.

Arc-Welded Alloy Steels in New Electric Excavators

A new series of Ward Leonard electric excavators, with capacities up to 4 cu. yd. is announced by the Harnischfeger Corp., Milwaukee, Wis. Complete one-man control for all operations in travel and steering, as well as digging, is combined with faster speeds, less weight and greater electrical horse power per pound.

In these machines, P&H designers have taken advantage of two basic developments: New alloy steels and arc-welded construction to cut down inertia losses and speed up operations. Large members, such as boom and dipper sticks, are of high-tensile steel for lightness with greater strength. Cast

Shovel with one-man control.

frames have been discarded for lighter all-welded construction with structural steels.

Special emphasis has also been placed upon weight reduction in the more scientific placement of machinery units behind the center of rotation to balance the front end. Hence the machines require less counterweight.

Every motion in hoisting, crowding, swinging and traveling is powered by an independent motor. All motors are synchronized for proper coördination and each is separately controlled by push button from the operator's station. Swing speeds are increased to 3½ r.p.m. and travel speeds to 1½ m.p.h.—remarkably fast for a machine of this size.

In contrast to conventional design, the new P&H Ward Leonards use worm gear in the crowd mechanism for the first time in any power shovel. According to P&H engineers, this design eliminates brake wear and results in a faster, smoother crowding action, which makes it possible to shake the dipper without strain.

Basic Cone-Crusher Features Retained in Smaller Model

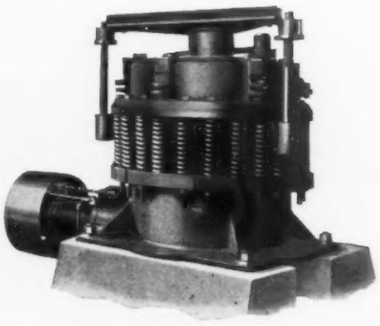
Because of the generally recognized advantages of the Symons cone crusher, there have been many instances where a crusher of this type was preferred, but, because of the great capacity of fine product delivered by even the smallest size available, it could not be used for those particular applications. Although the standard size cone crusher is already built in six sizes, to meet the demand for a smaller machine, a seventh size known as the 20-In. Model has recently been made available by the Nordberg Mfg. Co., Milwaukee, Wis.

This smaller crusher has the same general construction and has much the same external appearance as these larger sizes. There are a few details in which the design varies slightly, these being brought about by the decrease in size of these parts.

The most important feature, that of the process of crushing, is identical with that of the larger sizes. Such factors as wide movement of the head, rapid gyration, the shape of the crushing cavity, the action of the head on the material crushed, the manner of feeding, the large opening created on the discharge side for the release of the crushed fines have been retained on the 20-In. Model.

This crusher is also protected from damage from tramp iron by a circle of heavy coil springs. This safety feature is just as essential on a small crusher as on the larger models.

With the threaded arrangement of the bowl, it is possible to change the size of product easily and quickly, in fact, this can be done while the crusher is in operation.



Small cone-crusher model.

The bowl can be raised or lowered and the opening between head and bowl liner increased or decreased, this being done by means of the windlass regularly provided.

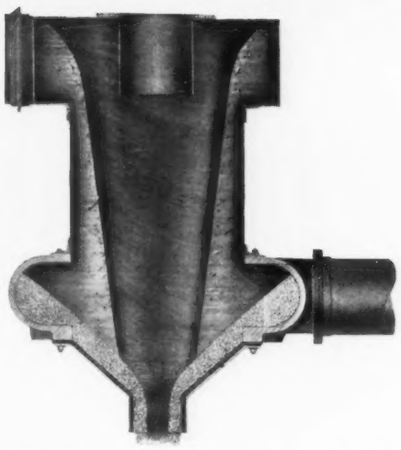
The feed platform is triangular in shape, and is fitted with a feed spout for regulating the feed onto the oscillating feed plate, which distributes the incoming material evenly around the crushing cavity.

The construction, following the usual Symons practice, is one that will permit of hard service, yet with a minimum of repairs. Steel castings are used for the major parts, the gear and pinion are of steel, and all bearings are of bronze and renewable. Any part subject to wear can be replaced, and the crusher always maintained in the best operating condition.

Develops Gravel-Washing and Separating Equipment

A. M. Lockett & Co., New Orleans, La., have developed washing and separating equipment for the sand-and-gravel industry. The Lockett-Holloway separator was developed for the primary purpose of separating trash from gravel and has been tested out in actual operation. This unit is designed to be attached to the end of a dredge pump discharge line and is a stationary unit requiring no power to operate.

This separator is based on the principle



Separator which removes trash from sand and gravel.

that in a vortex caused by water entering tangentially a vertically-placed cylinder any material actually in suspension will find its way to the inner surface of the vortex and any materials too heavy to remain in suspension will drop to the bottom.

The base of the separator consists of a centrifugal pump casing above which is the vertical cylinder and below which is a conical discharge opening. Water enters the casing tangentially through what is ordinarily the discharge opening the resulting whirling motion creating and maintaining a vortex. The trash gathering at the inner surface of the vortex overflows with the water through a tangential outlet. Provision can be made for reclaiming the water after it leaves the separator. The cleaned gravel and sand settles into the cone at the base of the separator from which it is discharged with very little water. This cone is usually lined with rubber or other abrasion-resisting material.

The Pearl River gravel washer is an earlier development designed not only to remove trash but to eliminate clay balls and mud as well. It is a mechanical device consisting essentially of a revolving drum in the shape of a double cone in which the material being washed is subjected to direct washing action. Abrasion of particles against each other also serves to disintegrate clay balls or coating on the material.

The material enters this washer through a chute on which water sprays are directed. In the drum additional sprays combined with the abrading action break down foreign materials which, with the trash and water, are discharged through the feed opening of the washer counterflow to the direction of the flow of material. Angle plates on the inner shell can be adjusted to accelerate or retard the material flow.

Near the discharge end of the washer at the point of largest diameter is a perforated plate with a central opening and attached to this plate are perforated buckets intended to lift the gravel through this opening into the end cone from which the cleaned material passes out the end opening due to accumulation and accelerated by suitable angle plates fastened to the inner surface. Additional sprays give the material a final rinse at this point. The washer revolves on anti-friction-bearing rollers and is said to require comparatively little power. A comparatively large volume of water is required but it is not necessary to introduce this under pressure.

Appoints Sales Engineer

Raymond Bros. Impact Pulverizer Co. announce the appointment of J. F. Benton as sales engineer, operating from the Chicago Office, and specializing in the phosphate rock and fertilizer field.

Mr. Benton comes to the Raymond organization with an extensive record of experience in the cement, lime and fertilizer industries, both as a plant operator and sales executive. For many years, he was engaged in the construction and operation of cement plants for several leading concerns in this country and Canada. While with the Fuller Lehigh Co., his sales work included the marketing of cement, lime, gypsum, fertilizer and chemical machinery in the United States and Europe.

For the past twenty years, Mr. Benton has been associated with the Kent Mill Co. as sales manager, where he gained wide acquaintance among producers, particularly in the fertilizer trade. With his thorough knowledge of modern pulverizing and separating machinery, Mr. Benton is well qualified to serve the needs of producers requiring specialized equipment.

TRAFFIC

(*From page 59*)

penses amounting to $100,000 due to the general increase in prices. During the first eleven months of 1935 the petitioners had a deficit in net income of more than $25,000. They point out that at the end of 1935 railroads operating 27.8 per cent. are of the entire railroad mileage of the United States were in the hands of receivers or trustees. The net return on the investment of the railroads for 1932 was 1.24 per cent.; for 1933, 1.81 per cent.; for 1934, 1.78 per cent. and for the first eleven months of 1935, 1.85 per cent., according to the petition. As the present emergency charges do not expire until June 30 there should be sufficient time for the Commission to give shippers an opportunity to be heard on this subject.

Transportation News

The Commission's Report to Congress— Both the Interstate Commerce Commission and the Federal Coördinator of Transportation have made a report to Congress for the year 1935. Of particular interest to the non-metallic minerals industry is the recommendation made by both the Commission and the Coördinator that the equidistant clause of the Fourth Section be repealed. The Coördinator makes the recommendation that his office be made permanent but the Commission did not concur in this recommendation but took a neutral stand on it.

Motor-Vehicle Transportation — The Commission has issued an order extending, until March 2, the time for filing motor carrier tariffs which tariffs will become effective April 1. This is the last postponement that can be made under the law. A tariff circular giving the rules governing the filing of tariffs has been prepared by the Commission and is known as "Tariff Circular M. F. No. 1."

The motor-carrier industry is rapidly becoming organized under the American Truckers' Association. A National Conference of Motor Freight Rate and Tariff Bureaus has been organized and held a meeting in Chicago on January 18 and 19. At that time there were 27 recognized motor tariff bureaus. Each of these 27 bureaus was assigned a definite territory over which they were to have jurisdiction in the matter of publishing rates. There are eight territories following generally the railroad rate territories. These eight are Eastern Trunk Line, Central Freigh' Association, Southern, Western Trunk Line, Southwestern, Intermountain, North Pacific Coast and South Pacific Coast territories. Rates between the various territories have been definitely assigned to the various bureaus.

To list the motor-tariff bureaus and the definite territory over which each has jurisdiction would require considerable space but if a sufficient number of readers of PIT AND QUARRY are interested in this information it will be shown in a future issue.

The motor-freight classification which is being compiled by a sub-committee of the American Truck Associations, Inc., is to be distributed by the A. T. A. and concurrences in this publication are to be handled by that organization.

Announces New 6-Cylinder High-Speed Diesel Engines

As another step in their program to have available a complete line of high-speed 6-cyl. Diesel engines paralleling in performance and installation dimensions, similar displacement gasoline engines, Hercules Motors Corp. of Canton, O., now announce the series "DJX" Diesels.

Both models in this series are 6-cyl., the smallest, the "DJXB," having a 3½-in. bore and 4½-in. stroke, a 260 cu. in. displacement.

The "DJXC" has a bore of 3 11/16 in. and 4½-in. stroke, with a 288 cu. in. displacement.

These are believed to be the smallest high-speed heavy-duty Diesels offered by any American manufacturer. This "DJX" series of Diesel engines are interchangeable from an installation standpoint with the extensively used Hercules "JX" series of gasoline engines—thus providing manufacturers the opportunity to supply either gasoline or Diesel engines in their equipment without any mounting complications.

The general design of the "DJX" series follows that developed by Hercules in their two larger Diesels, the "DHXB" and "DRXB," including the patented auxiliary combustion chamber—which assures very complete combustion—controlling also the burning of the fuel, which results in smooth, powerful, flexible and economical performance. This pre-combustion chamber (an entirely American development, designed and patented by Hercules), is located at the side of the cylinder bore, and the "throat" which connects the cylinder with the chamber is so designed that the piston on its approach to top center on the compression stroke gradually reduces the throat area, thus automatically increasing the velocity of air entering this chamber, at the time fuel is injected, insuring very thorough mixing of fuel and air.

Trade Literature

Heitzman Safety Blasting Plug. 4 p. (Heitzman Safety Blasting Plug Co., Shamokin, Pa.) An expanding plug for sealing the blasting charge in drill holes, eliminating the need for tamping, is simply described and illustrated in this circular.

Vibrating Types of Materials Handling Equipment. 64 p. (Cat. No. 610. Jeffrey Manufacturing Co., Columbus, O.) Features Jeffrey-Traylor electric-vibrating equipment; gives specifications of the various types; deals extensively with typical installations covering feeding, screening, conveying, packing, cooling, drying and other handling operations.

Morris Slurry and Sludge Pumps. 16 p. (Bull. No. 156, Morris Machine Wks., Baldwinsville, N. Y.) A new bulletin on centrifugal pumps for handling slurry, sludges, fine abrasives and gritty mixtures. Explains in detail how these severe services require special design of casing, impeller, stuffing box, bearings, etc., and graphically illustrates the Morris features that meet these requirements. Also includes helpful suggestions for maintaining the initial efficiency of Morris pumps on abrasive-handling services.

Type TY Reduction Crusher. 16 p. (Bull. No. 112. Traylor Eng. & Mfg. Co., Allentown, Pa.) A new booklet of easy-to-understand illustrations, specifications and maintenance data concerning a compact crusher of the gyratory type.

Steel Storage Tanks. 24 p. (Tech. Bull. No. 11. Chicago Bridge & Iron Wks., Chicago, Ill.) Contains extensive notes on tank design and construction and includes numerous tables of engineering data.

Worthington Horizontal Duplex Piston Pumps. 4 p. (Worthington Pump & Machinery Corp., Harrison, N. J.) Describes and illustrates a line of renewable liner pumps of the Type VA for handling liquids at pressures up to 125 lb. per sq. in.

Nelson Type K Loaders. 4 p. (N. P. Nelson Iron Works, Inc., Passaic, N. J.) Describes and illustrates two popular bucket loaders for loose material and stockpile loading.

Steam Turbines for Mechanical Drive. 16 p. (General Electric Co., Schenectady, N. Y.) Contains valuable information on the application of steam turbines for the mechanical driving of pumps, fans, compressors, pulverizers, blowers, etc.

Blaw-Knox Trukmixers. 16 p. (Bull. No. 1521. Blaw-Knox Co., Pittsburgh, Pa.) Contains interesting photographs and truck-mixers and agitators manufactured by this company in service in various cities through the country. Specifications for the five sizes from 1 to 4 cu.yd. are included.

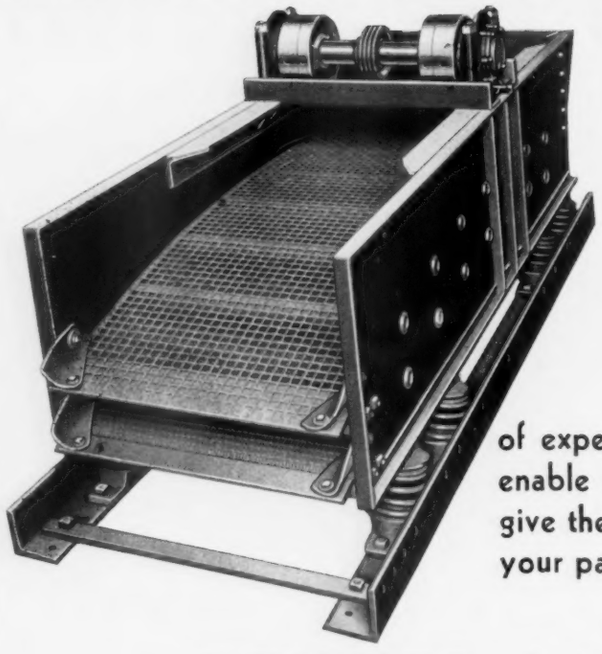
Bulk-Material Handling Machinery. 288 p. (Palmer-Bee Co., Detroit, Mich.) A complete catalog, well illustrated, containing specifications and descriptive text covering the extensive line of elevating and conveying machinery made by this concern.

Line-Arc Contactors. 4 p. (Two circulars, Electric Controller & Manufacturing Co., 2700 E. 79th St., Cleveland, O.) Describes new line of contactors.

Timken Tapered Roller Bearings. 12 p. (Booklet, Timken Roller Bearing Co., Canton, O.) Discusses advantages of Timken bearings in reducing operating friction, simplifying starting in cold weather, and eliminating piston and cylinder wear.

Slurry and Sludge Pumps. 4 p. (Bulletin No. 207, Lawrence Machine & Pump Corp., 371 Market St., Lawrence, Mass.) Describes pumps especially adapted for pumping liquids containing abrasive solids in suspension.

IMPROVED DEISTER PLAT-O SCREEN



More Powerful—Greater Capacity—
More Ruggedly Built for the Big Jobs
. . . . . The Brute Jobs of Screening

Designed to take the shock of heavy tonnages and give smooth, reliable service with no vibration transmitted to the supporting structure.

Plat-o Screens are Custom Built. Years of experience of Deister Machine Co.'s engineers enable them to recommend the proper screen to give the greatest capacity and highest efficiency on your particular screening job.

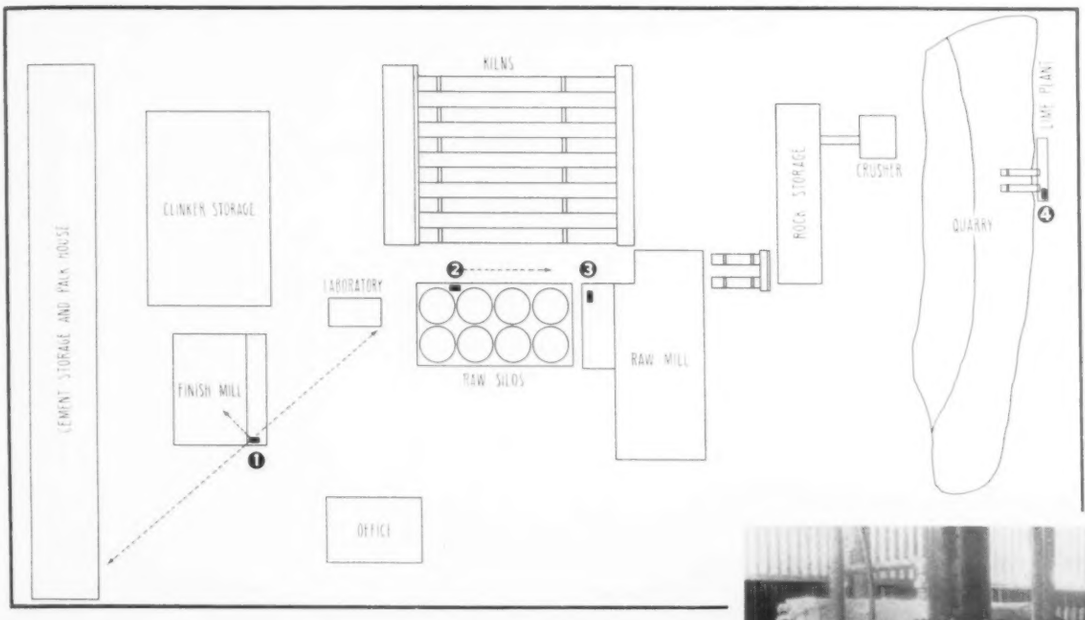
Write for our Bulletin No. 22

DEISTER MACHINE CO.

1933 E. Wayne Street — FORT WAYNE, INDIANA

Emil Deister, Sr., Pres. — I. F. Deister, V. Pres. — Emil Deister, Jr., Secy.-Treas.

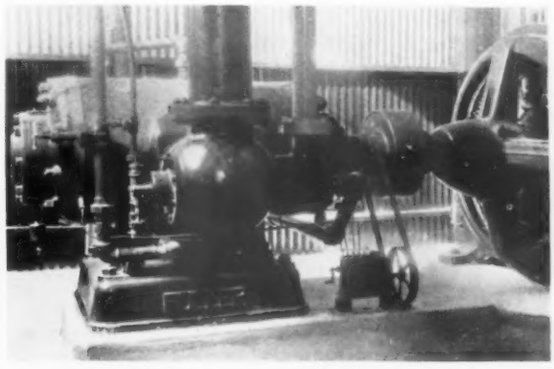
"SPOT" YOUR COMPRESSORS WHERE YOU NEED THE AIR



THE above drawing illustrates how one western cement company modernized its method of air supply by installing Fuller Rotary Air Compressors at or near the point where air is needed. This company, previous to the change, was operating a so-called central system of air supply, with the resultant losses so prevalent in such a layout.

Each compressor is designed to satisfy separate demands for volumes and pressures. There is no excessive idling time . . . no necessity to operate a large machine at poor power efficiencies to meet a small demand when some air consuming units are idle . . . no high main supply pressure reductions for low pressure uses. Power losses, due to friction in long pipe lines, and leakage possibilities are reduced to a minimum.

When modernizing your plant, include Fuller Rotary Air Compressors for economy and reliability. We will be glad to make studies of your present layout and suggest a modern, up-to-date system. No obligation on your part whatsoever.



Fuller Rotary Single-Stage Air Compressor of the type installed in plant referred to in this advertisement

❶ Fuller Rotary Single-Stage Compressor, furnishing 30 lb. air for finishing mill, cement storage and pack-house, and laboratory.

❷ Fuller Rotary Single-Stage Compressor, furnishing 30 lb. air to Fuller-Kinyon Pump for conveying kiln feed.

❸ Fuller Rotary Single-Stage Compressor furnishing 35 lb. air to Fuller-Kinyon Pump for conveying raw material to silos.

❹ Fuller Rotary Single-Stage Compressor, furnishing air to oil burners at lime plant.

Fuller Company
CATASAUQUA, PENNA. U. S. A.

Chicago: 1118 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.

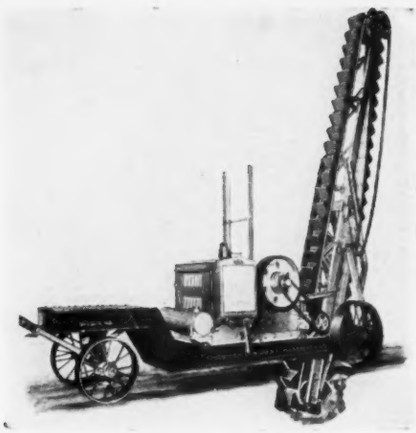
C-6

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · AUTOMATIC BATCH WEIGHERS · · · BIN SIGNALS

GRUENDLER

CRUSHERS

For primary secondary and fine reduction in a complete line of sizes for all requirements

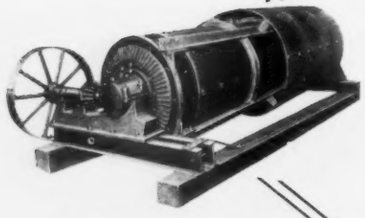


PORTABLES

For crushing, screening and conveying in capacities from 100 to 4000 tons daily

UNIT PLANTS

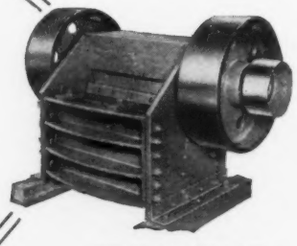
Portable, semi-portable and stationary. One reduction operations on aggregates.



SCREENS

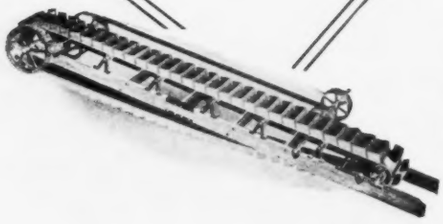
Revolving type, heavy duty Screens for maximum continuous capacity. Standard sizes with perforated plates or wire cloth.

4-SQUARE QUALITY



CRUSHERS

Roller bearing jaw crushers show extraordinary economies in power and lubrication.



ELEVATORS

Both chain and belt types. Steel idler rollers and one-piece malleable steel buckets. Full range of capacities.

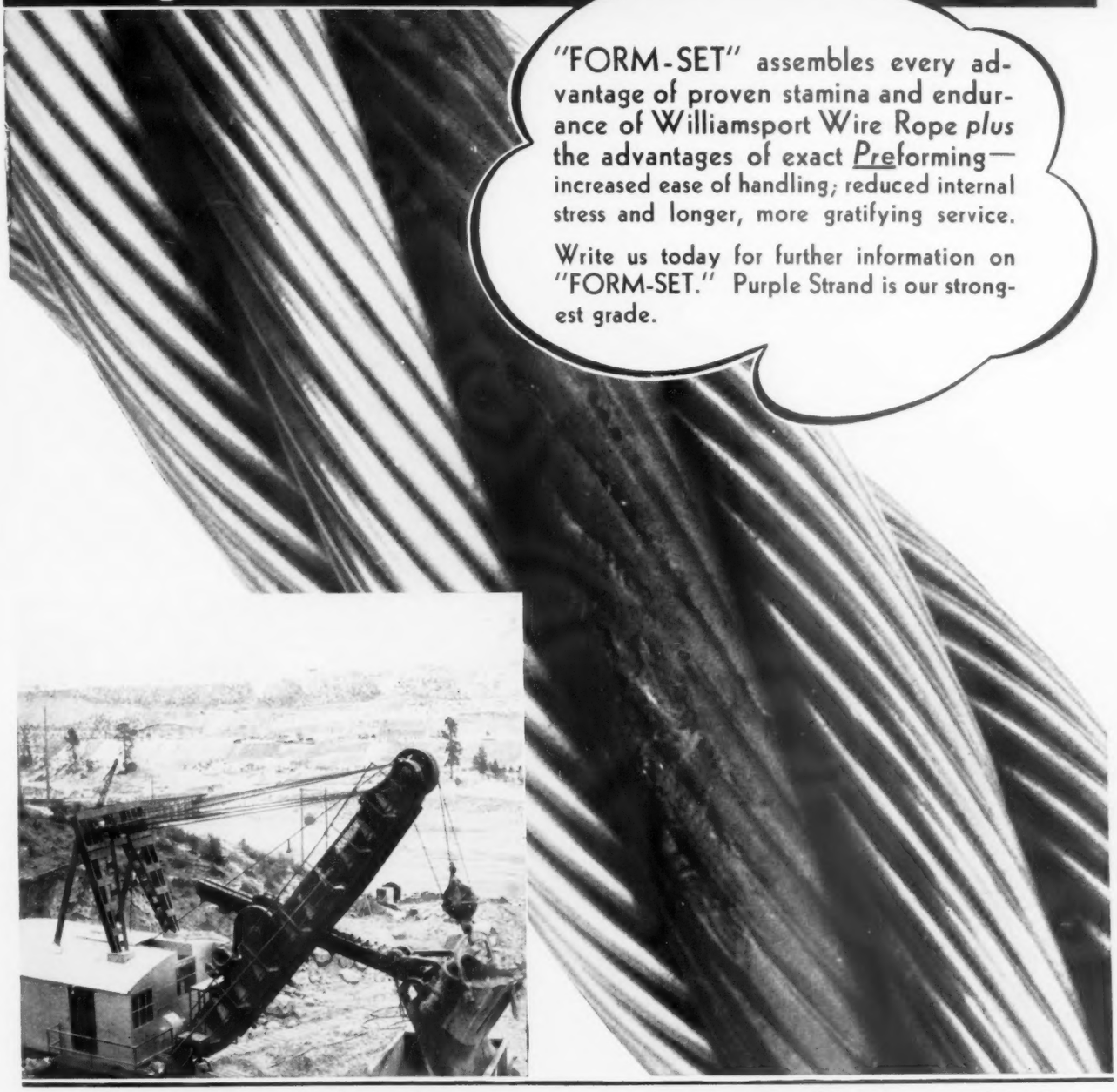
GRUENDLER equipment is backed by a half-century's experience in designing machinery for crushing, screening and material handling. It includes the latest mechanical developments to insure economies in operation and maintenance. To save horse-power, upkeep expense, and to produce uniform materials at low cost, specify Gruendler equipment on all jobs.

Write for Catalogs

GRUENDLER CRUSHER & PULVERIZER CO.

Dept. P&Q, 2915 N. Market Street **St. Louis, Missouri**

If preformed wire rope serves you best Try "Form-Set" Williamsport's method of preforming



"FORM-SET" assembles every advantage of proven stamina and endurance of Williamsport Wire Rope *plus* the advantages of exact Preforming—increased ease of handling; reduced internal stress and longer, more gratifying service.

Write us today for further information on "FORM-SET." Purple Strand is our strongest grade.

WILLIAMSPORT WIRE ROPE CO.

WILLIAMSPORT, PA.

122 So. Michigan Ave., Chicago, Ill.

Other Offices in All Principal Cities

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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*Eagle Iron Works

Agitators, Thickeners and Slurry Mixers
*Hardinge Co.
*Traylor Engr. & Mfg. Co.

Air Compressors (Portable)
Gardner-Denver Co.
*Traylor Engr. & Mfg. Co.

Air Compressors (Stationary)
Gardner-Denver Co.
*Traylor Engr. & Mfg. Co.

Air Filters
Dracco Corp.
*Parsons Engr. Corp.
*Western Precipitation Co.

Air Pumps
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Air Separators
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
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Ash and Refuse-Handling Equipment
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*Link Belt Co.
*Robins Conveying Belt Co.

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Republic Rubber Co.

Belts (Fan)
Goodrich Co., B. F.
Republic Rubber Co.

Bin Gates
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Industrial Brownhoist Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.

Bins (Cast Iron)
*Allen-Sherman-Hoff Co.

Bins (Steel)
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Plugs
Heitzman Safety Blasting Plug Co.

Blasting Supplies
*Ensign-Bickford Co.
Heitzman Safety Blasting Plug Co.

Blocks (Sheave)
*American Hoist & Derrick Co.
American Manganese Steel Co.
Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
Sprout, Waldron & Co.

Bodies (Motor Truck, Concrete Mixing)
Jaeger Machine Co.

Boots (Rubber)
Goodrich Co., B. F.

Borings, Core
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Bronze Work (Ornamental)
National Wire Cloth Co.
*Tyler Co., W. S.

Bucket Elevators (See Conveyors and Elevators)

Buckets (Clamshell, Orange-Peel, Etc.)
*American Hoist & Derrick Co.
American Manganese Steel Co.
Bucyrus-Erie Co.
Haiss Mfg. Co., Geo.
Industrial Brownhoist Corp.
*Link-Belt Co.
Wellman Engr. Co.

Buckets (Dragline—Cableway)
Bucyrus-Erie Co.
*Link-Belt Co.
*Sauerman Bros., Inc.
Wellman Engr. Co.

Buckets (Elevator and Conveyor)
Cross Engr. Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Buggies (Dump)
Koehring Co.

Bulk-Cement Storage Plants
Sprout, Waldron & Co.

Cableways
*American Steel & Wire Co.
*Link-Belt Co.
*Roebling's Sons Co., John A.
*Sauerman Bros., Inc.

Calcium Chloride
Calcium Chloride Assn.

Capstans (See Winches and Capstans)

Car Dumpers
Industrial Brownhoist Corp.
*Link-Belt Co.
Wellman Engr. Co.

Car Pullers
*Jeffrey Mfg. Co.
*Link-Belt Co.

Carriers
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Car Wheels — (See Wheels — Car)

Castings
American Manganese Steel Co.
*Eagle Iron Works
*Hardinge Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete-Mixing Plants (Complete)
Sprout, Waldron & Co.

Chain (Dredge and Shovel)
Manganese Steel Forge Co.
Ryerson & Son, Joseph T.

Chain Drives
*Link-Belt Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Cross Engr. Co.
Haiss Mfg. Co., Geo.
Industrial Brownhoist Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

Chute Lining (Rubber)
Goodrich Co., B. F.

Chutes and Chute Liners
American Manganese Steel Co.
Cross Engr. Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Classifiers
*Deister Machine Co.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Simplicity Engr. Co.

Clips (Wire Rope)
American Hoist & Derrick Co.
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Clutches
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

Concrete Breakers
Gardner-Denver Co.

Concrete Mixers
Jaeger Machine Co.
Koehring Co.

Concrete Slab-Raising Equipment (Mud-Jacks)
Koehring Co.

Cones (Sand-Washing)
Iowa Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Conveyors and Elevators
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
Cross Engr. Co.
Dracco Corp.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.

Conveyors (Pneumatic)
Dracco Corp.

Conveyors (Ready-Mixed Concrete)
Haiss Mfg. Co., Geo.
Jaeger Machine Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Coolers (Clinker)
*Allis-Chalmers Mfg. Co.

Coolers (See Kilns and Coolers —Rotary)

Couplings (Flexible and Shaft)
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Cranes (Crawler and Locomotive)
*American Hoist & Derrick Co.
Bucyrus-Erie Co.
Industrial Brownhoist Corp.
Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.
Michigan Power Shovel Co.

Cranes (Overhead)
*Curtis Pneumatic Machy. Co.
Industrial Brownhoist Corp.

Crusher Parts
American Manganese Steel Co.
*American Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Crushers (Cone)
Nordberg Mfg. Co.

Crushers(Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
Bonnot Co.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng Corp

Crushers (Jaw and Gyratory)
*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

*** See also information in the 1935 Pit and Quarry HANDBOOK.**

MR. PRODUCER

Check the Facts in this letter:—

Why don't you duplicate these results in your plant?

Ask for details of No. 19 Crusher, described in this letter.

Telephone I.Exington 2-2387 2-2388
CABLE ADDRESS: JEKENGINE

Paris Office
40 Rue Des Mathurins

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION
2 PARK AVENUE, NEW YORK
AT 32nd STREET

Manufacturers of
CRUSHING, MINING AND CEMENT MACHINERY
PULVERIZED COAL EQUIPMENT
PNEUMATIC TRANSPORT SYSTEMS
SCREENING, ELEVATING, CONVEYING, TRANSMISSION MACHINERY

January 1st, 1936

Subject:

Stone & Gravel Producers, Inc..
Anywhere,
U. S. A.

Gentlemen:

Is your plant equipped to produce minus 1/4" and plus 1/8" stone for top dressing, as well as 3/4", 1/2", 3/8" and 1/4" sizes? There is a great demand today for minus 1/4" and plus 1/8" material. Our little #19 gearless gyratory crusher for fine crushing will enable you to meet this demand.

A carefully conducted test was recently run on one of our #19 crushers operating on hard dolomite limestone 2½" oversize. This machine produced more than 25 tons an hour of minus 1/4" and plus 1/8" material. 20% was minus 1/8". This little #19 crusher is operated by a 25 HP motor. The actual power consumed is 21 HP. In the same plant they have one of our #25 crushers with a 25 H.P. synchronous motor built in the pulley. This machine produces 78 tons an hour when set to 7/8" on the closed side.

We have hundreds of customers who are getting equally good results. The performance described above is not unusual with our machines.

Getting double the capacity with 1/2 the power should be interesting to all people in the stone business.

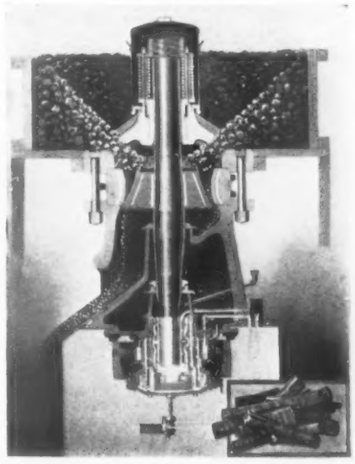
If you are interested and would like to have one of our sales engineers call on you to discuss this important subject, please wire at our expense. You will be under no obligation because of his call.

Very truly yours,

KENNEDY VAN SAUN MFG. & ENG. CORP.

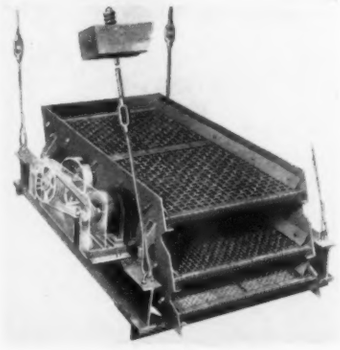
J. E. Kennedy
President

JEK/p



KENNEDY BALL BEARING GEARLESS GYRATORY CRUSHER

The sensational performance of this efficient unit is attracting the attention of producers everywhere. Increased tonnage with incredible savings of 50% in power consumption and 80% in maintenance costs.

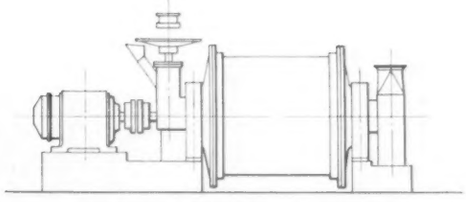


KENNEDY VIBRATING SCREEN

Specially adapted for scalping oversize from primary crushers, also for grading smaller sizes. Built open or enclosed, in widths of 3' to 6', and with one or more decks, for suspension or bottom support.

•

New Catalog No. 35-P-236
Sent Upon Request



KENNEDY GEARLESS TUBE MILL

For grinding limestone, minerals and the like, and for pulverizing coal for firing kilns and boilers.

KENNEDY-VAN SAUN MFG. & ENG. CORP.
2 Park Avenue New York, N. Y.
Sales Agents in all Principal Cities of the United States

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 86

Lewistown Foundry & Machinery Co.
New Holland Machine Co.
Nordberg Mfg. Co.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.

Crushers (Ring)
*American Pulverizer Co.

Crushers (Roll)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
Bonnot Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Robins Conveying Belt Co.

Crushers (Rotary)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
Bonnot Co.
New Holland Machine Co.

Crushing Rolls
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bonnot Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Traylor Engr. & Mfg. Co.

Derricks and Derrick Fittings
*American Hoist & Derrick Co.

Diesel Engines (See Engines—Diesel)

Dipper Parts
American Manganese Steel Co.

Dippers and Teeth (Power Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
Koehring Co.

Dragline Cableway Excavators
*American Hoist & Derrick Co.
Bucyrus-Erie Co.
Good Roads Machy. Corp.
*Link-Belt Co.
*Sauerman Bros., Inc.

Dragline Excavators
*American Hoist & Derrick Co.
Bucyrus-Erie Co.
Industrial Brownhoist Corp.
Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.
Michigan Power Shovel Co.

Dragline Excavators (Walking)
Bucyrus-Monighan Co.

Dredges
*American Hoist & Derrick Co.
Bucyrus-Erie Co.
Hetherington & Berner, Inc.
*Morris Machine Works

Drilling Accessories
Gardner-Denver Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
Gardner-Denver Co.

Drills (Core)
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Diamond)
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Hand-Hammer)
Gardner-Denver Co.

Drills (Rock)
Gardner-Denver Co.
*Jeffrey Mfg. Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Dust Arresters
Dracco Corp.
*Parsons Engr. Corp.
*Western Precipitation Co.

Dust Collecting Systems
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Dracco Corp.
*Parsons Engr. Corp.
Raymond Bros. Impact Pulv. Co.
*Western Precipitation Co.

Dust Conveying Systems
*Allen-Sherman-Hoff Co.
Dracco Corp.
*Parsons Engr. Corp.
*Western Precipitation Co.

Dust Handling Systems (Hydro Vacuum)
*Allen-Sherman-Hoff Co.

Dynamite (See Explosives)

Electrical Equipment
*Allis-Chalmers Mfg. Co.

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Eliminators (Soft Stone) (See Soft Stone Eliminators)

Engineers
*Allis-Chalmers Mfg. Co.
Bacon, Inc., Earle C.
Bonnot Co.
Cross Engr. Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Wellman Engr. Co.

Engine Generator Sets
See Generator Sets (Engine).

Engines (Diesel)
Atlas Imperial Diesel Engine Co.
Buckeye Machine Co.
*Cooper-Bessemer Corp.
Cummins Engine Co.
Nordberg Mfg. Co.

Engines (Hoisting)
*American Hoist & Derrick Co.

Engines (Internal-Combustion)
Atlas Imperial Diesel Engine Co.
Buckeye Machine Co.
*Cooper-Bessemer Corp.
Cummins Engine Co.
Nordberg Mfg. Co.

Engines (Steam)
*Morris Machine Works
Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Fans (Exhaust)
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bonnot Co.
Good Roads Machy. Corp.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Floor Sweep'ng Systems (Hydro Vacuum)
*Allen-Sherman-Hoff Co.

Forges (Oil)
Gardner-Denver Co.

Fuses (Detonating)
*Ensign-Bickford Co.

Gaskets
Goodrich Co., B. F.
Republic Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gas Producers
Wellman Engr. Co.

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Gears and Pinions
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Grab Buckets (See Buckets—Clamshell, Orange-Peel, etc.)

Grating (Steel)
*Hendrick Mfg. Co.
Ryerson & Son, Joseph T.

Grinding Balls (See Balls, Grinding)

Grizzlies
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Eagle Iron Works
Good Roads Machy. Corp.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Manganese Steel Forge Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.

Guards (Wire)
Manganese Steel Forge Co.
National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Hoists
*American Hoist & Derrick Co.
Gardner-Denver Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Sauerman Bros., Inc.
Smith Engr. Works
Sprout, Waldron & Co.

Hoppers
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
Goodrich Co., B. F.
Republic Rubber Co.

Hose (Radiator-Engine Cooling)
Goodrich Co., B. F.
Republic Rubber Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
American Manganese Steel Co.
Good Roads Machy. Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Traylor Engr. & Mfg. Co.

Kilns (Vertical)
*Hardinge Co.

Lime-Handling Equipment
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Raymond Bros. Impact Pulv. Co.
*Robins Conveying Belt Co.

Lime and Hydrating Plants
*Hardinge Co.

Lime Kilns
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Linings (Ball- and Tube-Mill (See Mill Liners and Linings)

Loaders and Unloaders
Bucyrus Erie Co.
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
Industrial Brownhoist Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Locomotives (Electric, Gas and Steam)
*Lima Locomotive Works

Locomotives (Trolley-Battery)
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
American Manganese Steel Co.
Manganese Steel Forge Co.
Ryerson & Son, Joseph T.

Manganese Steel (Plates and Sheets)
American Manganese Steel Co.
Manganese Steel Forge Co.
Ryerson & Son, Joseph T.

Mechanical Rubber Goods
Goodrich Co., B. F.
Republic Rubber Co.

Mill Liners and Linings
American Manganese Steel Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
Bonnot Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Fdy. & Mch. Co.
Raymond Bros. Impact Pulv. Co.
Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.

Motors (Internal-Combustion) (See Engines—Internal-Combustion)

Nails
*American Steel & Wire Co.
Ryerson & Son, Joseph T.

Netting (Locomotive Stack)
Tyler Co., W. S.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
*Deister Concentrator Co.

Packings
Goodrich Co., B. F.
Republic Rubber Co.

Partitions (Wire)
National Wire Cloth Co.

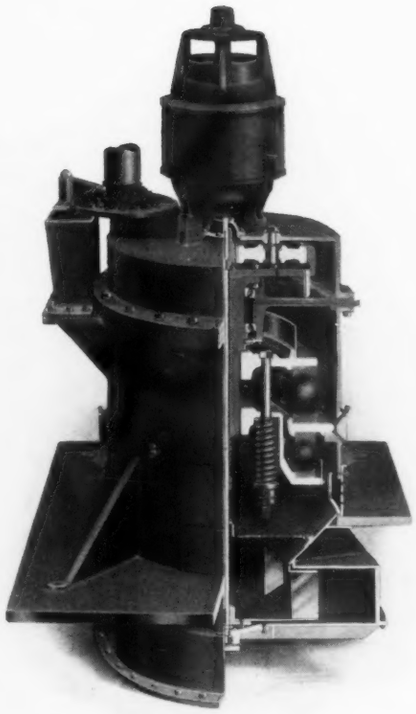
Paving Mixers
Jaeger Machine Co.
Koehring Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
Chicago Perforating Co.
Cross Engr. Co.
*Hendrick Mfg. Co.
Ryerson & Son, Joseph T.
Sprout, Waldron & Co.

Pipe, Dredge (Floating and Shore)
Taylor Forge & Pipe Works

***See also information in the 1935 Pit and Quarry HANDBOOK.**

TRAYLOR - COLLINS Pulverizer Mill



The Traylor-Collins Pulverizer Mill will be found efficient and economical for the grinding of coal for many purposes, particularly for direct firing of kilns; for the lime industry; in the manufacture of ceramics, brick and clay products; in the fertilizer field; for the grinding of rock for many uses; and many other applications.

Operators interested in cost-cutting processes should closely investigate this new machine. Write to our office nearest you for our bulletin No. 1002.

TRAYLOR ENGINEERING & MFG. CO.

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CHICAGO
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SALT LAKE CITY
101 West Second South St.

LOS ANGELES
919 Chester William Bldg.

SEATTLE
6311 22nd Ave., N. E.

Timmins, Ontario, Canada
P. O. Box 113

MANILA MACH. & SUPPLY CO.
Manila and Baguio, P. I.

Robins Conveyors (So. Africa) Inc.
Johannesburg, Transvaal, S. A.

Export Department—104 Pearl St., New York City.

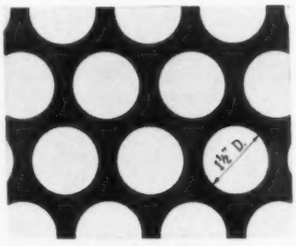
Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Iquique, Oruro

European Works—Usines Carels Freres, Ghent, Belgium

PERFORATED PLATE . . .

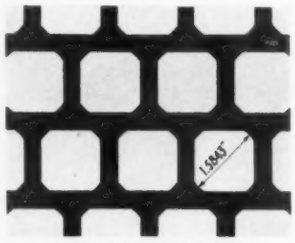
with the Style of Opening Suited to the Job

BY HENDRICK



ROUND

1½" opening . . . ⅜" bar . . .
58% open area
provides the most accurate, uniform sizing.



SQUAROUND

1⅝" opening . . . ⅜" bar . . .
58% open area
strong screen plate that provides accurate sizing.

How slightly the shape of your perforated plate openings affects screen capacity, when *equivalent* sizes are compared, can be seen from the drawings reproduced here.

Despite variations in the size of the openings, plate made with any of these four shapes will provide equivalent open area . . . and deliver a product of approximately equivalent size.

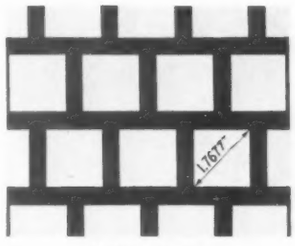
Thus it is the nature of your screening work that should determine the shape of opening to be used.

With facilities for producing any needed shape of opening, Hendrick is in position to counsel with you and recommend the most effective screening medium for your job. Consult us.

HENDRICK MANUFACTURING CO.
39 Dundaff St., Carbondale, Pa.

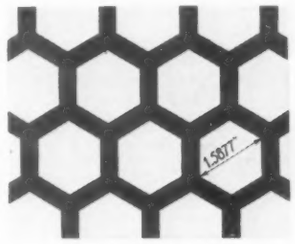
SALES OFFICES IN PRINCIPAL CITIES
PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.



SQUARE

1¼" opening . . . ⅜" bar . . .
59% open area



HEXAGONAL

1¼" opening . . . ¾" bar . . .
62% open area
Accurate sizing . . . large open area.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 86

Pipe Flanges
Hetherington & Berner, Inc.
Ryerson & Son, Joseph T.
Taylor Forge & Pipe Works

Plants (Aggremeter) (See Aggremeter Plants)

Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Portable Crushing and Screening Plants
*American Pulverizer Co.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.

Pulverizers (See also Crushers; Mills; etc.)
*American Pulverizer Co.
Bonnot Co.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Foundry & Machinery Co.
New Holland Machine Co.
Raymond Bros. Impact Pulv. Co.
Traylor Engr. & Mfg. Co.

Pump Valves (See Valves, Pump)

Pumps (Cement Slurry)
*Allen-Sherman-Hoff Co.
*Morris Machine Works

Pumps (Centrifugal)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Victor Equipment Co.

Pumps (Dredging)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Bucyrus-Erie Co.
Hetherington & Berner, Inc.
*Morris Machine Works
Victor Equipment Co.

Pumps (Sand and Gravel)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Victor Equipment Co.

Rock Drills (See Drills—Rock)

Rod Mills
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Traylor Engr. & Mfg. Co.

Rods (Welding)
Ryerson & Son, Joseph T.

Roofing and Siding (Steel)
Ryerson & Son, Joseph T.

Rope (Wire) (See Wire Rope)

Rubbish Burners
Cross Engr. Co.

Sand Separators
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Simplicity Engr. Co.
Smith Engr. Works

Sand—Lime—Brick Machinery
*Hardinge Co.

Sand-Settling Tanks
Good Roads Machy. Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Scrapers (Power Drag)
Iowa Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Screens
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Audubon Wire Cloth Corp.
Bacon, Inc., Earle C.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engr. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
Good Roads Machy. Corp.
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
National Wire Cloth Co.
Nordberg Mfg. Co.
*Productive Equip. Corp.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Simplicity Engr. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Symons Bros. Development Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
*Deister Concentrator Co.
*Deister Machine Co.
Good Roads Machy. Corp.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Nordberg Mfg. Co.
*Productive Equip. Corp.
*Robins Conveying Belt Co.
Simplicity Engr. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Symons Bros. Development Co.
*Tyler Co., W. S.

Scrubbers
Knickerbocker Co.
*Tyler Co., W. S.

Separators (Air) (See Air Separators)

Sheaves
*Allis-Chalmers Mfg. Co.
*American Hoist & Derrick Co.
American Manganese Steel Co.
*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Jeffrey Mfg. Co.
McLanahan and Stone Corp.
Sprout, Waldron & Co.

Shovels (Electric, Internal-Combustion and Steam)
*American Hoist & Derrick Co.
Bucyrus-Erie Co.
Industrial Brownhoist Corp.
Koehring Co.
*Lima Locomotive Wks., Inc.
*Link-Belt Co.
Michigan Power Shovel Co.

Skip Hoists and Skips
*Allis Chalmers Mfg. Co.
*American Hoist & Derrick Co.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Soft Stone Eliminators
Knickerbocker Co.

Speed Reduction Units
Iowa Mfg. Co.
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Sprays
*Deister Concentrator Co.

Sprockets and Chain
American Manganese Steel Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Stabilized Road Mix
Calcium Chloride Assn.

Stackers
*Jeffrey Mfg. Co.

Steel (Alloy)
(See Alloys—Steel)

Steel (Abrasion Resisting)
Ryerson & Son, Joseph T.

Steel (Bars, Shapes, Plates, etc.)
Ryerson & Son, Joseph T.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

Storage Equipment
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Sweeping Systems
*Allen-Sherman-Hoff Co.

Tanks
*Hendrick Mfg. Co.
*Link-Belt Co.

Tanks (Sand-Settling)
Good Roads Machy. Corp.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

Thickeners (Slurry)
*Hardinge Co.

Tire Repair Materials
General Tire & Rubber Co.
Goodrich Co., B. F.

Tires (Tractor, Truck and Passenger Car)
General Tire & Rubber Co.
Goodrich Co., B. F.

Tools (Drill) (See Drilling Accessories)

Track Shifters
Nordberg Mfg. Co.

Tractors
*Allis-Chalmers Mfg. Co.

Tramways (Aerial)
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Transformers
*Allis-Chalmers Mfg. Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Trippers
Good Roads Machy. Corp.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills — Ball, Tube, etc.)

Tubes (For Tire Casings)
General Tire & Rubber Co.
Goodrich Co., B. F.

Underground Loaders
*Allis-Chalmers Mfg. Co.

Unloaders (Box Car)
*Jeffrey Mfg. Co.
*Link-Belt Co.

Valves (Pump)
Taylor Forge & Pipe Works

Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
Chicago Perforating Co.
Cross Engr. Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Vibrating Screens (See Screens—Vibrating)

Vibrators
*Jeffrey Mfg. Co.
*Tyler Co., W. S.

Wagons (Dump)
Koehring Co.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
Good Roads Machy. Corp.
Haiss Mfg. Co., Geo.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Welding and Cutting Equipment
Ryerson & Son, Joseph T.

Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.
Manganese Steel Forge Co.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.

Well Drills (See Drills—Well)

Wheels (Car)
American Manganese Steel Co.
*Eagle Iron Works
Iowa Mfg. Co.

Wheel Rims. See Rims—Wheel

Winches and Capstans
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Wire and Cable (Electric)
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Wire Cloth
Audubon Wire Cloth Corp.
Cleveland Wire Cloth & Mfg. Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
National Wire Cloth Co.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Tyler Co., W. S.

Wire Rope
*American Steel & Wire Co.
Hazard Wire Rope Co.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.
Williamsport Wire Rope Co.

Wire Rope Fittings
*American Hoist & Derrick Co.
*American Steel & Wire Co.
Hazard Wire Rope Co.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.
Williamsport Wire Rope Co.

Wire Rope Slings
*American Steel & Wire Co.
Hazard Wire Rope Co.
*Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Wire (Welding)
American Manganese Steel Co.
*American Steel & Wire Co.
Manganese Steel Forge Co.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.

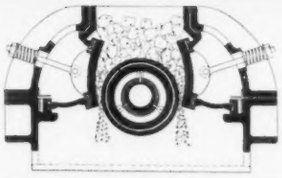
Worm Gears (See Gears and Pinions)

*** See also information in the 1935 Pit and Quarry HANDBOOK.**

BONNOT FOR PROFIT

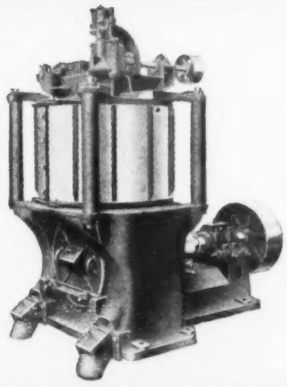
CONTINUOUS improvements in design and construction over a period of years have brought Bonnot equipment to a high degree of efficiency. The substantially lower costs of production, longer service life and lower maintenance expense, which you obtain from the use of Bonnot reduction machinery, assure larger profits for you in producing crushed or pulverized materials. Note the distinctive features in each of the following types of equipment.

REDUCTION CRUSHERS



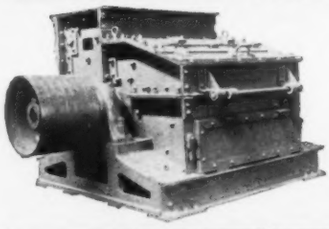
An entirely new principle of crushing, which includes the SLOW CREEP MANTLE for even distribution of wear over the crushing surfaces. Simple, rugged, and economical in power.

PULVERIZERS, ROLL TYPE



For grinding a great variety of crushed materials, including hydrated lime, quicklime, limestone, coal, clay, phosphate rock, barytes and similar products. Wearing parts few in number and easily replaced. Built in two sizes with 18 and 36-inch diameter rings.

HAMMER CRUSHERS



Swing-hammer type for high speed operation. Oversize bearings with shafts of specially heat treated steel. Breaker plate readily adjustable and faced with manganese steel. Hammers of special alloy steels, proven superior for long, continuous service.

ROTARY KILNS

Also Rotary Dryers, Dry Pans, Coolers, Tube Mills, Ball Mills and auxiliary equipment. Write for Bulletin of machines in which you are interested.

THE BONNOT CO.
CANTON *Since 1891* **OHIO**

BELT RECORD
Cost Finding Record Book for Conveyor Belts
FREE!
Cost-finding Record Book for users of conveyor belts. At last—easy but sure way to find brand and type of conveyor belt which costs least on your conveyors. Free to any user of conveyor belts, no obligation.

Includes Valuable Engineering Data

Besides forms on which to keep complete belt records, this book includes valuable engineering data on selection, installation and maintenance of conveyor belts.

★ ★ ★

Every user should have this book

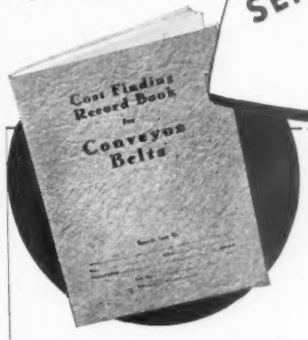
Here is the only *sure* way to find the lowest-cost belts for *your* operation. Original cost of belts doesn't count—it's *cost per ton* you should watch. Get this book and find out. Goodrich supplies the book free because we know you'll find that Goodrich belts—with their important improvements—last longer, handle more, cost less.

THE B. F. GOODRICH COMPANY
Mechanical Rubber Goods Division, AKRON, OHIO

★ ★ ★

There's no obligation. Regardless of brands of belt you use or intend to use, *get this free Record System. Mail the coupon NOW.*

SEND THE COUPON NOW

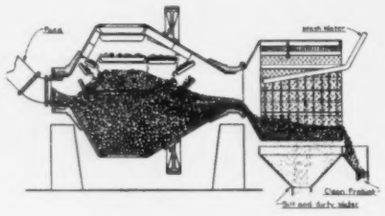


THE B. F. GOODRICH CO.,
464 S. Main St. Akron, Ohio

Without obligating us in the slightest, send copy of your free Cost-Finding Record Book for Conveyor Belts.

Company Name .....
Street Address .....
City ..... State .....
Individual's Name .....
Title .....

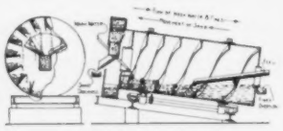
REDUCE CLAY BALLS to SLIME



The Hardinge Conical Scrubber is the only unit that will give a complete reduction of Clay Balls and assure clean Gravel, Stone or Sand.

For moderate washing, classifying, dewatering or dissolving, use

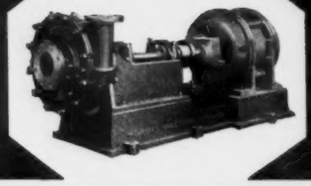
The Hardinge Counter-Current Classifier



Write for Bulletins No. 37 or No. 39

HARDINGE COMPANY
INCORPORATED
YORK, PA.—Main Office & Works Chicago—205 W. Wacker Drive
New York—122 E. 42nd St. San Francisco—444 Market St

MORRIS
CENTRIFUGAL PUMPS



For handling abrasive materials, corrosive liquids, or clear water. Special designs and materials for each service to provide long life, maintenance of initial high efficiency and low upkeep cost.

Write for Bulletins

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

MORRIS MACHINE WORKS • BALDWINSVILLE, N.Y.

Perforated Metals—Screens of All Kinds—For Sand, Gravel, Stone, Etc.

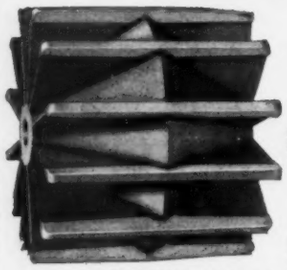
MATERIAL IN STOCK
PROMPT SHIPMENT

CHICAGO PERFORATING CO.
2435 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.

GOVCO PRODUCTS
The Original
Deister Concentrator Company
Incorporated 1906
911 Glasgow Ave., Ft. Wayne, Ind.
Export Office:
104 Pearl St., N. Y. City

Sand—WASHING TABLES—*Gravel*
HYDRAULIC CLASSIFIERS
VIBRATING SCREENS

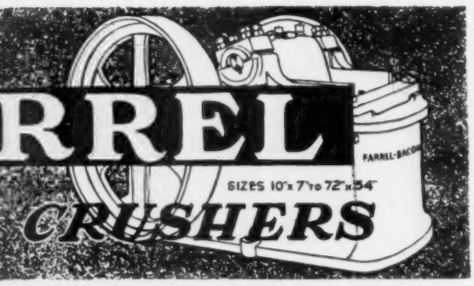
SAVE YOUR CONVEYOR and Elevator Belts *with* SPROUT-WALDRON Wing Pulleys



Interchangeable with standard pulleys. Nothing can lodge between belt and pulley.

SPROUT, WALDRON & CO. INC.
1221 SHERMAN ST., MUNCY, PA.
Elevating, Conveying and Transmission Equipment

BACON FARREL CRUSHERS

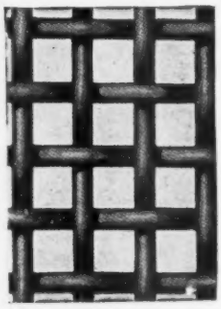


SIZES 10"x 7"to 72"x54"

Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

EARLE C. BACON, Inc.
17 JOHN STREET NEW YORK, N. Y.

FIVE STAR FEATURES of National Wire Cloth



- ★ Withstands vibration without crystallization
- ★ Super-tough to resist abrasion
- ★ Maintains accuracy throughout life of screen
- ★ Has outworn other special alloy cloths
- ★ Economical in price and serviceability

WRITE FOR BULLETIN

NATIONAL WIRE CLOTH CO.
Foot of Belle Street, St. Paul, Minn.

Immediate Acceptance

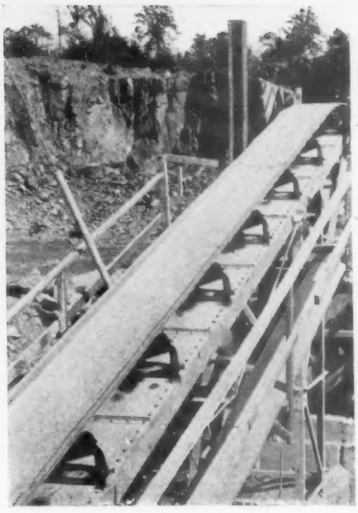
Because it is a champion in the 45-pound sinker class . . . because it combines greater drilling capacity with low air consumption and low maintenance . . . because of its exceptional easy riding, its remarkable hole-cleaning ability . . . the Gardner-Denver S-45 Sinker has won IMMEDIATE ACCEPTANCE.

SINCE 1859

GOOD Design, Materials, Workmanship, Value

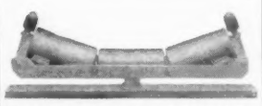
GARDNER-DENVER CO., 102 Williamson St., Quincy, Ill.

GARDNER-DENVER



TRAINERS

keep the Belts in Line!



ROBINS TROUGHING TRAINER

Does not wobble nor does it cause the belt to weave from side to side. The Trainer assumes a stable position which keeps the belt in line.

ROBINS RETURN TRAINER

When the weight of the belt falls more on one side, the heavy side rocks downward and forward, skewing the roller, thus holding the belt in a central position.

Crooked running spells early death to conveyor belts from chafing of belt edges against chutes and structures. Guide pulleys only serve to increase edge wear. To remedy the evil you must correct the cause. The substitution of a Robins Belt Trainer for every fifth or sixth regular carrying and return idler makes belts want to run straight and true. The instant response of the troughing trainer to its actuating side rolls and of the return trainer to its inclined pin support insures the belt being continually and automatically "trained" — without edge wear.

FOR THE AGGREGATES INDUSTRIES

Belt Conveyor Idlers, Belts, Belt Conveyors, Bucket Elevators, GYREX and VIBREX Screens, SUPER-GYRALOY Screen Cloth, ROBINS-ORO Manganese Steel Feeders, Bin Gates, Mead-Morrison Hoists and Grab Buckets.

MATERIAL HANDLING **ROBINS** EQUIPMENT

Robins products are described in various bulletins. Send for those of interest to you.

ROBINS CONVEYING BELT CO.
15 Park Row, New York, N. Y.

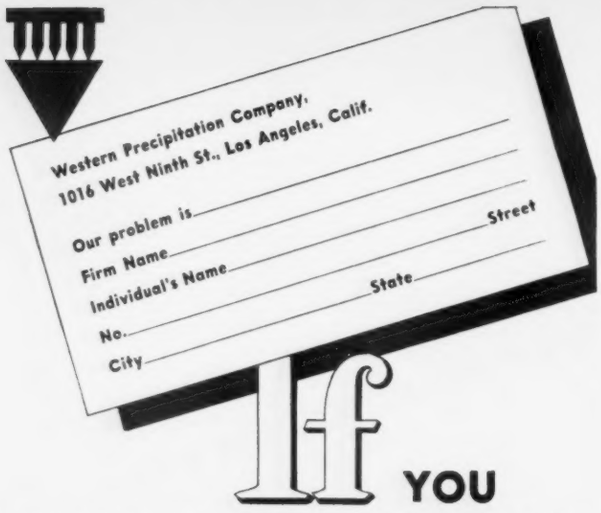
Please send me bulletin on Robins Belt Trainers.

Name .....

Firm .....

Address .....

City ..... *State* .....



If YOU HAVE A DUST PROBLEM MAIL THIS COUPON

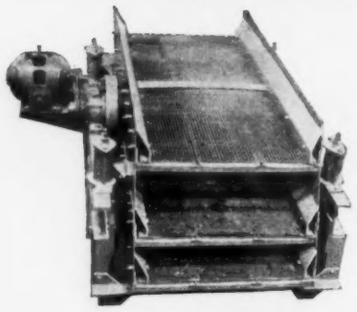
Dust or powder resulting from the operation of a process or incidental thereto can be most efficiently collected by the Multiclone System. Particles as small as 2 microns are recovered, depending on size, shape and specific gravity. Compact, durable and economical.

WESTERN PRECIPITATION COMPANY
Los Angeles • New York

Specialists in Dust and Fume Control for more than a quarter century.
SPRAY DRYERS • COTTRELL ELECTRICAL PRECIPITATORS

Good Roads MACHINERY

CHAMPION SCREENING and WASHING EQUIPMENT



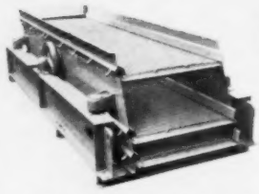
FEEDERS
ELEVATORS
CONVEYORS
BINS
CHUTES
GATES

Complete Plants—Portable or Stationary

CHAMPION ROLLER SKF BEARING CRUSHERS

Products of
GOOD ROADS MACHY. CORP.
KENNETT SQUARE, PENNSYLVANIA

TYLER SCREENS
CIRCLE-THROW MECHANICALLY AND ELECTRICALLY-VIBRATED



and Woven Wire Screen
In all Meshes and Metals
Scrubbers and Dryers

TON-CAP

THE W. S. TYLER COMPANY
3623 Superior Avenue Cleveland, Ohio

LEADERS SINCE 1835

CRUSHERS—Double roll and Sledge Wedge Crushers, for practically any product. Capacities to 1000 tons an hour.
SUPER DRY PANS—For especially large tonnages.
WASHERS AND SCRUBBERS—Steel log Washers; scrubbers, cylinder washers, sand drags and washing screens.
DRYERS—Revolving cylindrical, of various sizes.
JIGS—For concentrating and beneficiating hematite and manganese ores.
SCREENS—Cylindrical and conical screens of any size and capacity.
HOISTS, ELEVATORS AND CONVEYORS—Electric, friction and gravity hoists, steel conveyors of different sizes and capacities.

McLanahan & Stone Corp.
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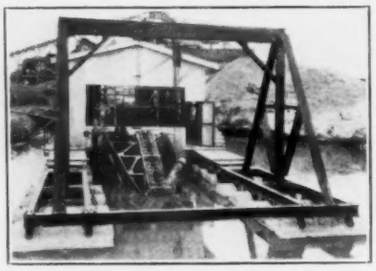
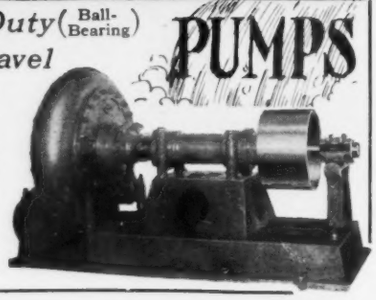
EAGLE SWINTEK SCREEN NOZZLE LADDER LOWER YOUR COST



Will eliminate stoppages and slug pumping—insuring an even, constant feed of solids to the suction nozzle—with less power—greatly decreasing the cost per yard of material produced
Write for descriptive literature and let us tell you how this can be done with your dredge.

Eagle Iron Works
Des Moines, Iowa

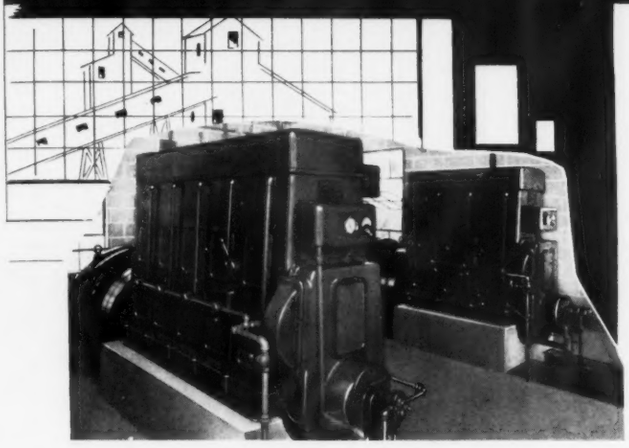
LIGHTNING PUMPS
Heavy-Duty (Ball-Bearing) Sand and Gravel



High efficiency — low operating cost—precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE

KANSAS CITY HAY PRESS CO.
KANSAS CITY, . . . MO.

You Can REDUCE Your Power EXPENSE with BUCKEYE DIESEL ENGINES



Buckeye's compact and modern design is years ahead of the field. It is the only Diesel that gives improved design and construction. These modern features insure long life, high efficiency, low maintenance—all meaning lower power cost!

Many Plant Owners have reduced Electric or Steam power costs by installing Buckeye Diesel Engines to run their plants.

These Diesel Engines operate similar to electric motors, they start and stop by the turn of a lever. No specially trained Engineers are necessary. They burn cheap fuel oil and power produced costs less than one cent per K. W.

Let us show you the Diesel Savings for your plant, and explain the "Buckeye Savings Purchase Plan" of installing the Diesels and taking practically all of the pay out of savings effected while running your plant. There is no cost or obligation. Write us today.

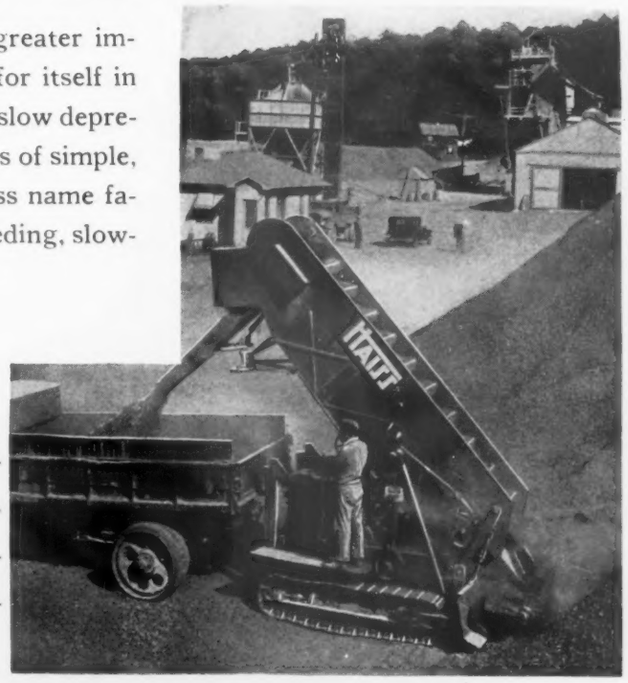
THE BUCKEYE MACHINE CO.
LIMA, OHIO

ENGINE BUILDERS SINCE 1908

BE PROFITWISE AND DIESELIZE with Buckeye

In Buying a LOADER

. . . there never was a time when quality was of greater importance. You must have machinery that will pay for itself in extra work capacity, extra economical operation and slow depreciation. Today, more than ever, you need the features of simple, rugged Loader efficiency which have made the Haiss name famous—enclosed transmission, revolving propeller feeding, slow-speed crowding, easy operating control.



Write for catalog and 1936 prices on the model that fits your need.

George Haiss Manufacturing Co., Inc.
142nd St. & Rider Ave., New York

MODEL "135" 5 yds. per min.
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HAISS "Path Digging" LOADERS

ALSO: CLAMSHELL BUCKETS . . HOPPER GATES . . SCREENS . . ELEVATORS . . CONVEYORS & PARTS.

Ryerson Abrasion Resisting Sheets and Plates Last Longer

This new type of steel resists wear many times longer than ordinary steel. Write for complete data—also stock list showing steel of every kind, shape, and size. Immediate shipment assured. Joseph T. Ryerson & Son, Inc., Chicago, Cincinnati, Milwaukee, Boston, Detroit, Philadelphia, Cleveland, Buffalo, St. Louis, Jersey City.

RYERSON STEEL

Diesel and Gas Engines from 30 to 1250 H. P. for Every Power Need

2 AND 4 CYCLE — VERTICAL AND HORIZONTAL SIZES

THE COOPER-BESSEMER CORPORATION

MT. VERNON, OHIO — PLANTS — GROVE CITY, PA.

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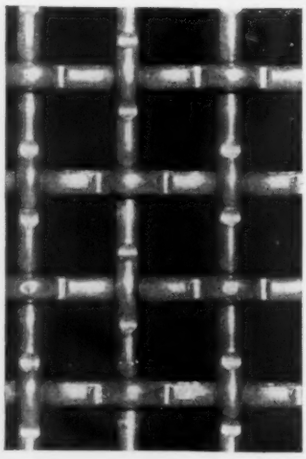
VIBRALOY Abrasive Resisting Screens

Hard—Tough Springy

Write for Cat. 40-3

AUDUBON
WIRE CLOTH CORP.
Subsidiary Manganese Steel Forge Co.
Mfrs. of Rol-Man
Castor Ave. & Allen St.
PHILADELPHIA, PA.

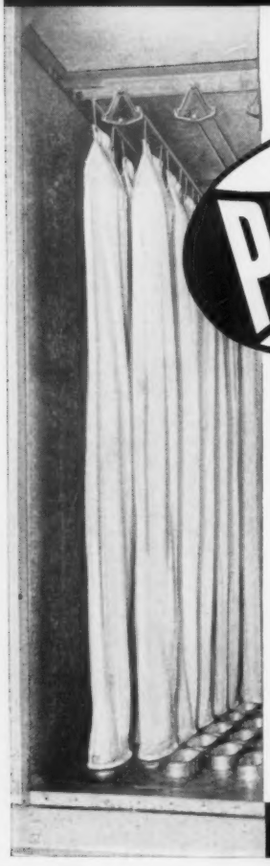


Lewistown Foundry Products ARE Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.
Lewistown, Pa.

OVAL BAG DUST ARRESTORS ✦ BLAST ROOMS ✦ OSCILLATING BLAST BARRELS ✦ EXHAUST SYSTEMS



PARSONS
PARSONS ENGINEERING CORPORATION CLEVELAND

Parsons Oval Bag Dust Arrestors combine the advantages of the screen and cylinder types.

Write for Bulletin DA-5.

PARSONS ENGINEERING CORPORATION
Cleveland Ohio

CEDAR RAPIDS - SYMONS SCREENS

More Efficient
Greater Yardage
Larger Profits
Made in a Complete Range of Sizes

FOR ALL PORTABLE ROCK, SAND OR GRAVEL PLANTS
ASK FOR SPECIAL BULLETIN

IOWA MANUFACTURING COMPANY
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SAUERMAN LONG RANGE EXCAVATORS

Sauerman Cableways for wet pits and Sauerman Crescent Scrapers for dry pits and banks have no equals for economy.

SAUERMAN BROS., Inc.
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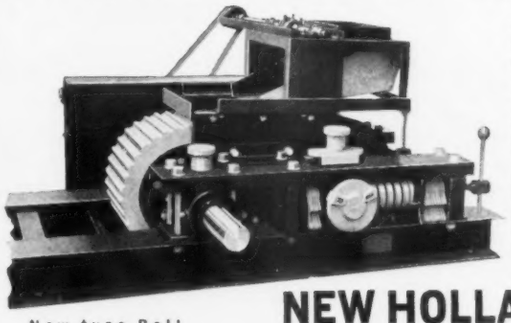
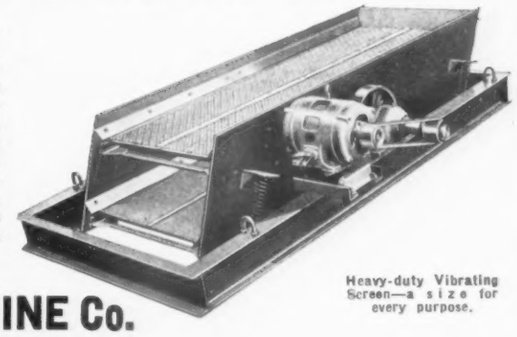
ELIMINATE NON-DURABLE PARTICLES
FROM SAND OR GRAVEL — USE
THE SIMPLICITY D'CENTEGRATOR
THREE YEARS OF SUCCESSFUL LARGE
SCALE OPERATIONS IN VARIOUS PLANTS
THE SIMPLICITY ENGINEERING COMPANY
DURAND, MICHIGAN

For Speedy Production New HOLLAND Crushers and Screens



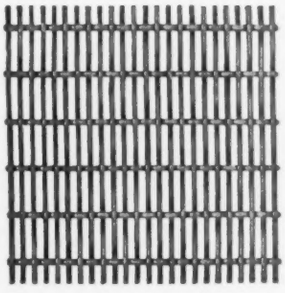
New type Roll Crusher for chips, sand, etc.

Low priced, high quality Crushers that do a big day's work in a hurry —Tough long-wearing Screens that make difficult screening easy, and made in one, two and three-deck types, with sturdy vibrating mechanism for insuring rapid, uniform sizing. Write for BULLETIN of this economical equipment.



Heavy-duty Vibrating Screen—a size for every purpose.

NEW HOLLAND MACHINE Co.
P. O. Box No. 200 New Holland, Penna.



Rolled Slot

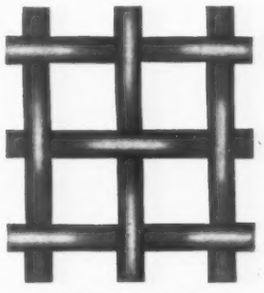
ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
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HYDROSEAL DREDGE PUMP

Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request.

ALLEN-SHERMAN-HOFF CO.
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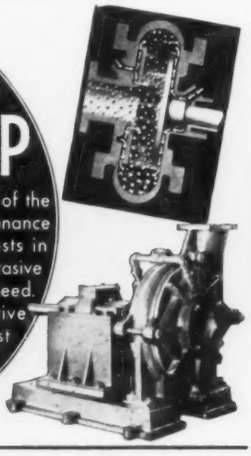

Williams "Champion"

Faster
DIGGERS!

Williams Buckets, famous for output and durability, are built in Power-Arm, Multiple-Rope and Dragline types —in a size for every need. *Write for bulletins.*

The Wellman Engineering Co.
7014 Central Ave.
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WILLIAMS
• BUCKETS •

HEITZMAN
SAFETY BLASTING PLUG

Here is today's answer to the blasting problems of misfires, dud-blasts, wet charges, waste explosives and CARELESSNESS.

It acts as a positive safety device, eliminates tamping or stemming, and saves from 25% to 50% in explosives.

Easy to use in wet or dry ground for blasting in highway construction, quarries and mines. Use a Heitzman Plug and "Carry your tamping in your vest pocket."

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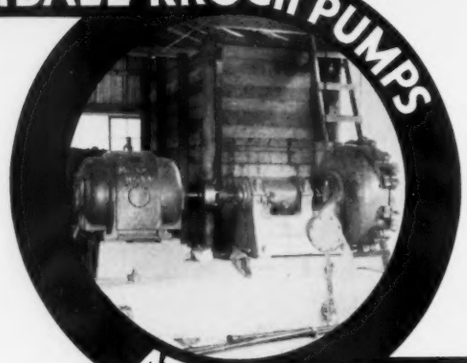
SAFETY BLASTING PLUG CO.
SHAMOKIN PENNSYLVANIA

KIMBALL KROGH PUMPS



AT COULEE DAM

THE world's biggest sand washing and handling job is using Kimball Krogh Sludge Pumps for Coulee Dam. These pumps reclaim the water used in washing the materials, and thus salvage the fine sizes of sand, ordinarily wasted. Kimball Krogh Pumps handle the sludge from the clarifiers to the sand washers at a rate of 300 tons per hour at a 50% concentration. For dependable service on your pumping jobs, you can specify Kimball Krogh equipment with confidence and economy.

Information on request.

VICTOR EQUIPMENT COMPANY
Kimball Krogh Pump Division
1010 E. 62nd St. **Los Angeles**
515 Harrison St. **San Francisco**

Better Screening

FOR exact and careful screening of fine and coarse materials at low cost. Gives uniform vibration — no "dead" areas.

It is truly "A triumph of mechanical vibration." Send for catalog No. 1462.

LINK-BELT COMPANY
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LINK-BELT VIBRATING SCREEN

Installation at Newport Sand & Cement Corp., Rochester, N. Y.

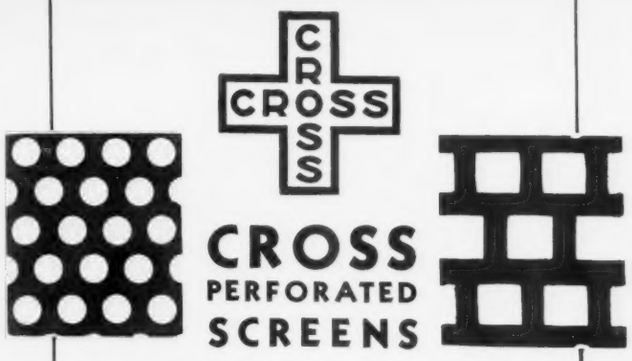
Recovering a Lost Market

If your gravel shows 20% to 25% sodium sulphate loss and a big customer allows only 15%, you lose the business.

UNLESS you do as this operator did, install a Knickerbocker Soft Stone Eliminator and cut the sodium sulphate loss down to well UNDER 15%. Thus he recovered a lost market. Are you ruled from certain desirable business that this equipment might recapture for you? If you have such a problem, write us.

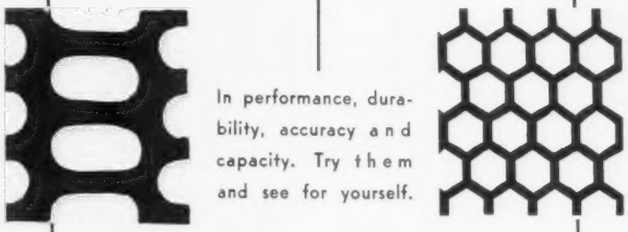
THE KNICKERBOCKER COMPANY,
603 Liberty St. Jackson, Mich.

KNICKERBOCKER
Soft Stone
Eliminator



CROSS PERFORATED SCREENS

GIVE SATISFACTION



In performance, durability, accuracy and capacity. Try them and see for yourself.

CROSS ENGINEERING CO.
Main Office and Mfg. Plant
CARBONDALE, PA.

The Profitable Way to Sell Concrete

JAEGER DUAL-SPEED TRUCK MIXERS of Man-Ten Long Life Steel

Rear Lift Hoist Attachment

One-Man Chute Saves Minutes Every Trip

Write for New Catalog
THE JAEGER MACHINE CO.
602 Dublin Avenue, Columbus, Ohio

MAKE THIS MONTH COUNT

Are you all set for that new job—the "big break"? Call it New Deal or whatever you want to, there's going to be plenty of dirt flying in the months to come and the important thing is to be ready to handle your share of it.

Don't overlook your equipment—look it "over"! And if it isn't up-to-date—if it isn't the best that money can buy—investigate the "AMERICAN" Line. Behind every unit there is skilled engineering, the best materials and the finest workmanship. Send for our latest catalog today.

AMERICAN HOIST & DERRICK COMPANY
SAINT PAUL, MINN[illegible]TA

AMERICAN GOPHER SHOVELS SINCE 1905

AMERICAN Gopher SHOVELS
CRANES · DRAGLINES

BARGAINS

1—Dust Collector (NEW—NEVER USED), Allis-Chalmers, 4 compartment, suitable for 9½x8x40 compeb mills.
1—Allis-Chalmers Revolving Screen, 72″x24′, closed end, complete with 15′ dust jacket, mounted on steel frame. Weight approx. 40,000 pounds.

VULCAN KILN & DRYER PARTS (NEW—NEVER USED)
(Drawings available)

1—Cast Steel Ring (for feed end of 7′6″ Kiln).
2—Cast Steel Girth Gears (for 7′6″ & 11′6″ Kilns).
4—Roller Bed Plates (3′6″ x 9′4″).
8—Rollers, 24″ x 12″ (cast steel).
4—Tires, 10″ to 11½″.
1—Air Seal for 11′6″ Kiln only.

IRON AND STEEL PRODUCTS INC.
Railway Exchange — Chicago

FOR SALE

Used Equipment—Ready to Work

One Erie Type B-high lift steam shovel on crawlers ready to work.
2—Osgood 1-yd. steam shovels on crawlers, A-1 condition.
2—Byers bear cats, 30 ft. booms, ½ yd. buckets.
1—Byers Bull Dog, full circle crane with 35 ft. boom and ½ yd. bucket.
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1—General Shovel, ⅝ yd. dipper.

Frank J. Rollings
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GOOD USED SHOVELS & CRANES

Loraine 75 Gas Shovel.....1¼ yd.
Link Belt K35 Gas Shovel.....1 yd.
Lima 101 Gas Shovel.....1¼ yd.
Link Belt Crane K44 Diesel.....60′ boom
Link Belt Crane K25 Gas.....40′ boom
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Northwest Comb. 105 ¾ yd. Gas..60′ boom
Meade Morrison Comb. ⅝ yd. Gas.30′ boom
Shovel Fronts 1 yd. Osgood No. 206 P. & H.

THOMAS DOYLE
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FOR SALE

1 BUCHANAN CRUSHER complete. Size 30″x42″. Type C. A-1 condition, extra Jaws. Also 1 set 36″x16″ Sand Rolls and 1 set 14″x 24″ Sand Rolls. All located Denver.

Gordon Construction Co.
1900 31st St. — Denver, Colo.

Jaw Crushers—2″x4″ up to 66″x84″.
Crushing Rolls—12″x12″ up to 54″x64″—Gyratory Crushers.
Ring Roll Mills—No. 0 and No. 1—Swing Hammer Mills.
Rotary Fine Crushers—No. 1, No. 1½, No. 2.
Direct Heat Rotary Dryers—4′x30′, 5′x30′, 5½′x40′, 6′x50′ and 7′x50′.
Semi-indirect heat Dryers—4′x30′, 4½′x26′, 5′x30′ and 8½′x75′.
Cement Kilns—3′ up to 8′ diameter.
Hardinge—Marcy & Fuller-Lehigh Mills.
Raymond Mills—No. 00, No. 0 and No. 1.
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1—Allis-Chalmers 42″x40″ Jaw Crusher.
Rebuilt Air Compressors.
Complete drying and asphalt mixing plants.

W. P. HEINEKEN
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FOR SALE

2—3½ ton 36″ ga. Plymouth Gas Locomotives.
12—5 yd. 36″ ga. Western Dump Cars.
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23—12 yd. Western 2-way Air or Hand Dump Cars.
4—50 ton 41 ft. Steel Flat Cars.
26—50 ton Center Dump Gondola Cars.
2—40 ton Baldwin S.T. Locomotives, 14x22 cyls.
Rails—First-Class Relaying Rails, 60, 70, 80, 85, 90 and 100 Lb. Rails and Bars, Tie Plates, Spikes, Switches.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg. — Railway Exchange Bldg.
CHICAGO, ILL. — ST. LOUIS, MO.

FOR SALE

VIBRATING SCREENS

4-3′x8′-2 Deck
GOOD CONDITION
REPOSSESSED BY MANUFACTURER

FOR PARTICULARS
WRITE
BOX 133 PIT & QUARRY PUB'NS
538 SO. CLARK ST., CHICAGO

FOR SALE

Gyratory Crushers: No. 6, No. 5 and 10″ Superior McCully, No. 5 Austin, No. 4 Style N, No. 3 and No. 2 Gates.
Symons Horizontal Disc Crushers: 48″ and 24″.
Jaw Crusher: 6x14, 8x16, 10x20, 16x24, 8x36, 11x36, 24x36.
Gas and Electric Motors: 1 HP to 200 HP.
Hoists: Clyde 2 drum for 2 yd. drag scraper, Thomas 2 drum for 1½ yd. drag scraper, several smaller.
Insley 5 ton all steel derrick, 80′ boom, 90′ mast, 2—55′ guy struts, 16′ bull wheel. 7x10 three drum hoist engine. 3x4 swing engine.
4 Complete gravel washing plants.

LIPPMANN ENGINEERING WORKS
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FOR SALE

COMPLETE—NEW 36″ CONVEYOR FOR SALE AT SACRIFICE PRICE.
250 Troughing Idlers. 150 Return Idlers. All Head & Tail Pulleys with Shafts and Bearings—Complete Set of New Gears—Angle Iron I Beams, Channel Iron and Other Parts to Make Up a Complete 36″ Conveyor. (Robbins Conveyor Co. Make.)
Complete New 36″ Pan or Apron Conveyor.
2 Complete Robbins Conveyor Co. Trippers. 36″.
App. 350 Ft. of New 36″x6 Ply Rubber Covered Conveyor Belting.
Lot of 18″, 22″, 24″, 30″, 36″ Rubber Covered Conveyor Belts, 5-6-7 Ply.
One 30 H. P. Single Drum Electric Hoist, $250.00.
Two Steam Hoists, 7¼x10 Double Drum, $150.00 Each.
Lot of New Wire Rope. All Sizes from ⅝″ to 2¼″ Dia. For Hoisting Guylines, Draglines, Cableway, Etc. Very Low Prices.

TERRENCE P. WYNN
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1—No. 6 Northwest dragline, 60′ boom 1¾ yd. bucket, Serial No. 2807, only handled 50,000 yds.
1—No. 105 Northwest crane, 45′ boom, 1 yd. clam, serial No. 1228, rebuilt.
1—No. 301 Koehring ¾ yd. shovel, Serial No. 700, Wisconsin engine, A-1 condition.
1—O. & S. ⅝ yd. gas crawler crane 35′ boom, reconditioned. Price....$1250.00
1—Model 35 P. & H. Backfiller, Waukesha engine, like new. Price.....$750.00
1—9B-3 and 1—9B-2 McKiernan-Terry hammers.
1—No. 1 Vulcan hammer.
1—No. 400 and 1—No. 800 Vulcan extractors.

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Milwaukee — Wisconsin

WE STILL HAVE BARGAINS

No. 37 Kennedy Gearless Gyratory.
28x36″ Traylor Jaw. Also other sizes.
Draglines and Shovels from 1 yd. up.
Diesel Units. All sizes up to 3000 HP.
Uniflow and Turbine Units. Generators.
Sauerman Outfits, Derricks, Hoists, Rail, Etc.

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501 Locust Street — St. Louis, Mo.

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300 tons 60 and 80 lb. relaying rail good condition.
60 ton Switching Steam Locomotive standard gauge.
100 ton Fairbanks R. R. Scale.

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Flat Rock, McCreary Co., Kentucky

FOR SALE

WILL SACRIFICE FOR QUICK REMOVAL

No. 1 Raymond Mill, 4½x12′ Abbe Tube Mill, Sturtevant No. 1½ Rotary Fine Crusher. Box 212, Pit and Quarry, 538 S. Clark St., Chicago.

CLOSING OUT ESTATE

(1) No. 300 P. & H. combination Crane, Dragline and Shovel, $3000.00.
(1) No. 5, No. 6 and No. 8 Allis-Chalmers Gyratory Crushers, $400.00 to $1000.00.
(1) 150 HP. Allis-Chalmers Electric Motor 700 RPM 2200 Volts 3-Phase 60 Cycle and smaller sizes.

All machinery first class condition.
M. Wenzel, 229 Southwest Blvd. Kansas City, Mo.

FOR SALE

1 Whitcomb 5 ton Gasoline Locomotive, 36″ gauge.
2 Koppel Standard Dump Cars, 4 cubic yard capacity, 36″ gauge.
All in first class condition. Used very little.

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320 North Avenue — Bridgeport, Conn.

SPECIALS FOR THIS MONTH
300 H.P. GE slipring motor 25/3/2200/375
150 H.P. Allis-Chalmers slipring motor 25/3/2200/500
125 H.P. Allis-Chalmers slipring motor 25/3/440/1500
300 H.P. GE slipring motor 25/3/440/500
75 H.P. GE slipring motor 25/3/440/750
50 H.P. Wagner slipring motor 25/3/440/750
Complete stock 60 cycle motors and transformers

ERIE ELECTRIC MOTOR REPAIR CO., INC.
126 Church St. — Buffalo, N. Y.

50-Steel Hopper Cars.—Self Clearing: 50 Tons capacity.

FAIRBANKS TRACK SCALE
Type S-No. F-254908—150Tons.

RAILS } GOOD RELAYERS 80 lb. ASCE Sections.

BOSTON IRON & METAL CO.
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Barber-Greene Gas powdered loader on crawlers $750.00
3x6 double deck vibrating screen..... 295.00
Telsmith single screw washer..... 250.00
24 in. Symons Disc reduction crusher..... 525.00
25 H.P. Brand new Waukesha power units... 150.00
40 H.P. Brand new Climax power units..... 385.00
70 H.P. Brand New Twin City Power Unit... 550.00

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Liquidator of Gravel Plant & Quarry Equipment

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Bargains in High Grade Rebuilt Equipment

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220/440 V., 60 Cy., 3 Ph.

1—250 Cr.-Wheeler Squirrel Cage	1800
1—200 G.E. Squirrel Cage	1800
1—150 G.E. Squirrel Cage	1800
1—150 WEM CS Squirrel Cage	1200
1—100 WEM CS Squirrel Cage	1800
1—100 WEM CS Squirrel Cage	1200
1— 75 Allis	1800
2— 75 G.E. K.T.	1200
1— 60 G.E. K.T.	1800
1— 50 G.E. K.T.	1800
2— 50 WEM CS	1800
6— 50 G.E. K.T.	900
1— 50 G.E. K.T.	1200
2— 40 WEM CS	1800
3— 40 G.E. K.T.	680
4— 40 G.E.	600
1— 75 WEM CS	900

Also, about 1000 other ratings, from ¼ H.P. up.

2—**Ridgeway Synchronous MG sets,** 150 KW, 275 V. DC 2300/60/3 AC with AC and DC panels.

MOTORS

2200 V., 60 Cy., 3 Ph.

1—300 Allis Squirrel Cage	900
3—200 WEM CS Squirrel Cage	1800
1—200 Allis Squirrel Cage	1800
2—300 G.E. Squirrel Cage	1200
2—100 WEM CS Squirrel Cage	1200
2— 75 G.E. M.T. Slip Ring	600
3— 50 G.E. M.T. Slip Ring	600
1— 50 G.E. M.T. Slip Ring	900
1— 75 G.E. M.T. Slip Ring	900
1—125 Allis Slip Ring	435

220/440 V., 60 Cy., 3 Ph.

1—200 WEM CW	500
2—250 WEM CW	680
1—150 WEM CW	585

3 Bearing with chain drive

1—100 G.E. M.T.	900
1— 75 G.T. M.T.	720
1— 75 WEM CW	900
1— 75 G.E. M.T.	900
1— 75 G.E. ITC	900
1— 75 WEM CI	870
2— 60 G.E. MTC	900
1— 50 G.E.	900

The above is only a partial list of equipment on hand. We have a large stock of transformers in various voltages—other M.G. Sets—Pumps—Industrial and Mine Hoists—Locomotives—Air Compressors, etc.

All equipment thoroughly rebuilt in our own Shop and guaranteed.

Phone, write or wire your inquiries and send us lists of equipment you have for disposal.

PENN ELECTRICAL ENGINEERING CO. 517 Ash St. Scranton, Pa.

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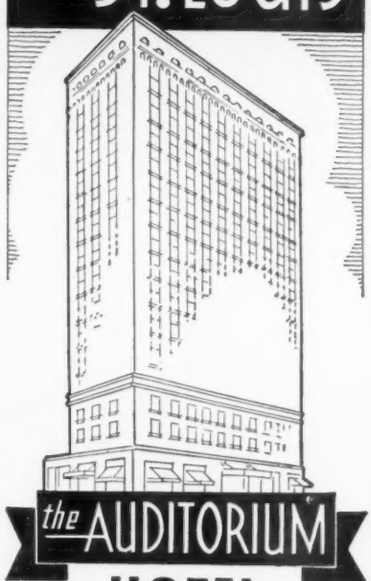

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1—Vulcan 40 ton Std. Ga. Saddle tank locomotive.
3—¾ yd. Koehring comb. shovels and cranes.
1—Marion 1 yd. Steam crane 40′ boom on cats.
1—Marion 15 ton gas crane 40′ boom.
1—Link-Belt K-2 crane 50′ boom, 15 ton capacity.
1—Link-Belt K-44 crane 50′ boom.
1—Browning ⅝ yd. shovel, 35′ crane boom.
1—Lorain 75 A 1¼ yd. chain crowd shovel.
1—Universal 7½ ton truck crane.
1—Monarch 75 Caterpillar with bulldozer.
1—Sullivan 310′ portable compressor.
1—Ingersoll-Rand pavement breaker.
1—Wolf Air Saw for Piles.
15—2 wheel concrete buckets.
1—Ransome 27 E Paver.
1—7 S Leach mixer.
2—1 yd. Insley bottom dump concrete buckets.
1—1 yd. Steubner bottom dump concrete bucket.
1—1 yd. Kiesler rehandling bucket.
1—1 yd. Blaw-Knox clamshell bucket.
1—¾ yd. Browning clamshell bucket.
1—¾ yd. Blaw-Knox bucket.
1—¾ yd. Hayward orange peel bucket.
1—Morris 8″ dredge pump 150 HP. GE. mtr.
1—Morris 10″ cent. pump 2250 GPM at 130′ head.
1—Goulds 12″ cent. pump 50 HP. GE. motor.
1—Thompson 6″ self priming pump Waukesha motor.
1—Amer. Well Wks. 6x8″ cent. pump 20 HP. Westing. mtr.
2—Humdinger 6″ self priming pumps, gas motor.
1—Humdinger 4″ self priming pump.
1—Humdinger 2″ self priming pump.
1—Domestic double diaphragm pump gas mtr.
1—GE. motor 200 HP. slipring.
1—No. 9 B-2 McKiernan-Terry Hammer.
3—No. 5 McKiernan-Terry Hammers.
4—No. 7 McKiernan-Terry Hammers.
20—12-yd. Western Std. Ga. 2-way dump cars vert. cyls.

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Marion Electric Shovel No. 350 —90 ft. Boom—6 cu. yd.

1—8′x125′ Rotary Kiln
1—8′x110′ Rotary Kiln
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2—No. 80 Bailey Feeders
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2—No. 57 Fuller Lehigh Mills
1—A-C Gates 4K Gyr. Crusher, 8x30
2—Penn S-7 Hammer Crushers, 36x16
1—A-C McCully Crusher, 10x52
1—Goodman No. 48 u/g elec. Shovel
1—25-T Loco. Crane 50′ & 75′ booms
2—80 c.f., 5-ton Hulett Buckets
3—1½-yd. Brown Ore Buckets
2—0-6-0 50-ton Baldwin Locos.
20 & 30-yd. Dump Cars
50-ton Gondola and Hopper Cars.
All Types of Crushers and Equipment.

IRON & STEEL PRODUCTS, INC.
657 Railway Exchange, CHICAGO

LOCOMOTIVES

3—50-ton American 4-wheel saddle tanks, 16x24″ cylinders, Code boilers, one built 1927.
4—40-ton American 4-wheel saddle tanks, 14x22″ cylinders, Code boilers, one built 1924.
5—40-ton Baldwin 4-wheel saddle tanks, 14x22″ cylinders, Code boilers, built 1924.

LOCOMOTIVE CRANES

1—30-ton American, 8-wheel, built 1925.
1—25-ton American, 8-wheel, built 1923.
1—20-ton Industrial, 8-wheel, built 1924.
All have Code boilers.

DUMP CARS

20—30-yard Western all-steel air lift door 2-way side dumps.
Complete stock list on request.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
Birmingham, Alabama

HERE THEY ARE—READY TO SHIP

15-N Allis-Chalmers Gyratory, Tex Rope Drive to 150 HP A. C. Motor.
9-K Gates Gyratory.
16-A Telsmith Gyratory.
Nos. 1, 3, 4, 5, 6, 7½ Gates Gyratories.
No. 40 Telsmith Reduction Gyratory Crusher.
18″, 24″, 30″, 48″ Symons Disc Crushers.
10x20 Jaw Crusher, All Steel Frame, Manganese fitted, with or without 4-Wheel Gooseneck Trucks.
11x36 Jaw Crusher, Manganese fitted.
6″, 8″, 10″, 12″, 15″, 18″ Manganese Steel Sand and Gravel Pumps.
5′x11′ Marcy Rod Mill.
No. 2 Williams Semi-Vulcanite Hammer Mill.
30-36 American Ring Roll Pulverizer.
42-42 American Ring Roll Pulverizer.
42-61 American Ring Roll Pulverizer.
3 Large Jeffrey Hammer Mills, Ball Bearings.
5′x40′, 5′x60′, 7′x70′ Direct Heat Rotary Dryers.
4—4′x15′ Hot Air Rotary Dryers.
20, 35, 50, 60, 80, 120 HP Gasoline Hoists, 1, 2, 3, Drums
3—110 CFM Portable Air Compressors.
2—678 CFM I-R type XCB Compressors.
750′, 1250′ I-R Steam Compressors.
N-1 Cement Gun.
5, 10, 25, 50, 75, 100 HP Electric Hoists.
½, ¾, 1, 1½, 2 Yd. Sauerman Drag Scraper Outfits.
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3—Model 42 Barber-Greene Loaders.
2—24″x60′ Barber-Greene Portable Belt Conveyors.
118 Ton Blaw Knox Steel Storage Bin.
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50—5 yard Western Dump Cars, 36" ga.
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2—40-ton Baldwin Switching Locomotives, Std. ga.
All in good condition; locomotives completely rebuilt. Very attractively priced.

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1½ miles 30 lb. ASCE portable track 36" ga., 30' lengths. Bethlehem Steel mine ties; 14 cars like new, Easton 36" ga., 2 cu.yd. V shape all steel heavy duty; 10 Easton 1½ cu. yd. 30" ga. V shape cars.

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9 x 24 "Cedar Rapids" Crusher rebuilt —fine condition--price reasonable.

N. P. WALTON, JR.
39 Cortlandt St., New York, N. Y.

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Thew Shovel, Gas, 4 Wheel, ¾ yd. bottom Dump Bucket.
3—V. Bottom side dump steel Cars, 36" Gauge, 3 yd. Cap.
1—100 Ton Steel Storage Hoppers, 3 Discharge gates, drag conveyor.
1—200 Ton Steel Storage Hopper, 3 Discharge gates.
2—Kent Ring Roll Mills for fine grinding.
1—Williams No. 3 Swing Hammer Mill.
1—Car Haul System, 11 Loaded Car Capacity.

BURTON MACHINE CO., INC., Norfolk, Va.

"BELT CONVEYORS"

Troughing type belt Conveyors and Conveyor Belts Bought and Sold.

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Empire Building, Pittsburgh, Pa.

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1—24x36 Farrel Type 14-B.
Champion Jaw Crushers—Nos. 3, 4, 4½, 5, 6, and 1040.
Bucket Elevators—Continuous and centrifugal —6" to 26" width.

JOHNSON AND HOEHLER, INC.
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UNUSUAL BARGAIN

2—7½ ton, 24" gauge Whitcomb locomotives. Condition perfect, practically as new. Price, each **$500**

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5 to 30-yd. Side Dump Cars.
30-ton Std. Gauge Locomotives.
1-yd. Link-Belt Cranes and Draglines.
1-yd. Northwest Shovel-Draglines.
Also general construction equipment.

CLAPP, RILEY & HALL EQUIPMENT CO.
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GOOD EQUIPMENT—PRICED LOW

Northwest 105 & 104 Cranes & Drags. Real buys. Gas Cat. Crane, ¾ yd., 40' boom. A-1. $1750. Thew ¾ yd. Gas Cat. Shovel, Crane, & Dragline. Universal ⅜ yd. Gas Cat. Shovel & Dragline. Barber-Greene, Haiss, & Link-Belt Loaders. Port. Belt Conveyors, 24x100, 24x70, to 18x25. Sauerman 1 yd. Drag Scraper Outfit; with or without Gas., Diesel, or Electric power. A-1. 9x16 Jaw Crusher on wheels. Elevator optional.

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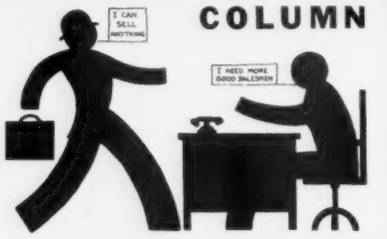

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IF you want to handle additional lines of equipment,
WRITE, keeping your message, if possible, to 30 words or less.
NO CHARGE FOR THIS SERVICE

Manufacturers of screening equipment can use active representatives in a few territories to sell a well known and established product. PRODUCTIVE EQUIPMENT CORPORATION, 210 E. Ohio Street, Chicago, Illinois.

We can use live responsible dealers in some territories who can sell gravel handling equipment. We offer a complete line of Crushers Screens, Conveyors, and Quarry, Gravel and Washing Plants. PIONEER GRAVEL EQUIPMENT MFG. CO., 1515 Central Avenue, N. E., Minneapolis, Minn.

We are seeking lively representation for snow loaders, bucket loaders and conveyors in the following States: Maine, New York, Western Pennsylvania, Ohio, Indiana, Illinois, Michigan and Wisconsin. N. P. NELSON IRON WORKS, INC., Passaic, N. J.

We are Manufacturers Representatives in Transmission & Conveying Machinery—would be interested in adding other lines. HARRY J. FERGUSON, 626 Race St., Philadelphia, Pa.

Are interested in getting a few live dealers to sell our hammermill. DIXIE MACHINERY MFG. CO., 4200 Goodfellow Ave., St. Louis, Mo.

Wanted—to sell high grade line of crushing plant equipment. BADGER ROAD EQUIPMENT CO., 321 No. 25th Street, Milwaukee, Wis.

Wanted: Salesmen and dealers with good contacts to sell Safety First Shoes. Safety Steel Toe prevents injuries, reduces accidents, lost-time, and compensation insurance rates. Recommended by Safety Engineers. NOW is the time, inquire for open territories. SAFETY FIRST SHOE CO., Holliston, Mass.

Wanted: Sales representatives on commission basis for our entire line of Centrifugal Pumps, Dredging Pumps and Hydraulic Dredges. Prefer men experienced with engineering equipment who are now selling other but non-competing lines. LAWRENCE MACHINE & PUMP CORP., 371 Market, Lawrence, Mass.

WANTED—Salesmen who are now calling on quarries and plants to handle an additional line on liberal commission. Highly profitable product with no competition or sales resistance, widely used as repair material on conveyor belts and other equipment. Give territory, experience and references. SELF-VULCANIZING RUBBER CO., INC., 605 W. Washington Blvd., Chicago, Ill.

We have some open territories and would like to make Distributor connections for handling steel bins, weighing batchers and scales and material handling and road building equipment. THE HELTZEL STEEL FORM & IRON COMPANY, Warren, Ohio.

Wanted: Dealers to sell The Heitzman Safety Blasting Plug for blasting Rock Quarries, Metal Mines, Coal Mines, Tunneling, and Construction work. Give references. HEITZMAN SAFETY BLASTING PLUG COMPANY, 1310 West Pine St., Shamokin, Penna.

Can make good use of additional good live dealers to sell our products. NEW HOLLAND MACHINE CO., New Holland, Pa.

We need some additional good, live dealers for some good territory open. We manufacture portable air compressors, elevators and machinery for mines, quarries, and gravel plants. O. K. CLUTCH AND MACHINERY CO., Columbia, Pa.

We have some desirable, unallocated territory, available. If interested please write us giving us complete information reference your organization, territory covered, number of salesmen employed, other lines handled, etc. THE GENERAL EXCAVATOR COMPANY, Marion, Ohio.

Representatives wanted to handle our product in different territories where we do not now have representatives. AUTOMATIC NUT CO., Lebanon, Pa.

Wanted Distributors who contact Quarries for sale of compressors and rock drills in Maine, Western Penna. and Kentucky. SCHRAMM, Inc., West Chester, Penna.

Trackson Tractor Shovels and Loaders dig, load, strip, etc. Economical and useful equipment for any quarry and profitable to dealers. Write today for information and territory available. TRACKSON COMPANY, Milwaukee, Wisconsin.

We are interested in securing Dealers for North Carolina, South Carolina, Georgia, Tenn., Louisiana, Mississippi, New England, Washington, Oregon, California, Michigan and Wisconsin. McLANAHAN & STONE CORPORATION, Hollidaysburg, Pa.

Wanted—Representatives in Kansas City and Charlotte, N. C., to handle complete line electric motors, generators and control. Write Ideal Electric & Mfg. Co., F. L. Hanson, East 1st & Oak Streets, Mansfield, Ohio.

We would like to get a representative for Alabama, Tennessee, Puerto Rico and Utah. Lippmann Engineering Works, 4603 West Mitchell Street, Milwaukee, Wisconsin.

The Osgood Company, Marion, Ohio, Manufacturers of shovels, cranes, draglines and clamshells, have an attractive proposition for distributors in certain open territories in the Southeast, the Northwest and the North Central West, for the sale of their new lines of excavating and material handling machinery.

Old established Compressor Manufacturer has available some good territory to reliable Distributors. Le Roi Co., 1706 S. 68th Street, Milwaukee, Wis.

Wanted—A few Good Live Dealers to handle our line of Sand and Gravel Pumps, etc. Address P. O. Box 150, The Norbom Engineering Co., Darby, Pa.

The Chrysler Portable Air Compressor is the only Compressor with Complete Automatic Control. This equipment features mobility, high volumetric efficiency, low initial cost, and many other outstanding engineering advancements. Chrysler Corporation—Amplex Division, Detroit, Michigan.

We are considering the appointment of dealers who are able to sell a high grade line of belt conveyor idlers, chains, sprockets, hand winches and similar equipment on a commission basis. C. O. Bartlett & Snow Company, 6200 Harvard Avenue, Cleveland, Ohio.

IN 30 DAYS

The highest bidder will buy

One 56" x 72" Buchanan Steel Jaw Crusher

Type C, with Texrope drive and 250 H. P. Allis Chalmers slip ring motor, 2200 volts, 3 phase, 60 cycles, and control.

In excellent condition—Used for one year

J. W. Hemmerle

R. D. 2, Conestoga, Pa. Phone: Millersville 197

Two Robins 24"x225' Belt Conveyors.
Robins 18"x170' Belt Conveyor.
Conveyor Idlers and Pulleys, 18" and 24".
Portable 14"x24' Flat Conveyor, LeRoi.
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Digging Truck Loader, Fordson traction.
Conveyor Belt and Elevator Buckets.
Chain Bucket Elevators, 10" and 12" wide.
Haiss and Owen ¾-yd. Clamshell Buckets.
¾-yd. Tipover Buckets and 3-yd. Grout Boxes.
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Buda 35 hp. 4-cylinder Gasoline Engine.
Chicago Steam Air Compressor, 10x12x10.
Jeffrey No. 3 Jaw Crusher and Hammer Mill.
Link-Belt Coal Crushing Rolls, teeth.
Kennedy No. 37 Gearless Gyratory Crusher.
Ingersoll-Rand 33 Leyner Drill Sharpener.
Backhoe & Skimmer Attachment for Bearcat.
Double 3" Diaphragm Electric Pump, 110 v.
Link-Belt 16"x25' Belt Conveyor, Steel.
Gould's 8" Centrif. Pump, Electric, 22 hp.
Swivel 24" Gauge End Dump Cars, ¾-yard.
V-Shaped Steel Cars for 24" and 36" Gauge.
Portable 24" Gauge Track and Switches.
Hoists: Gasoline, Electric and Steam.
Beaumont 2-drum 60 hp. AC Dragline Hoist.
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Johnston 50 hp. Locomotive Boiler, 125 lbs.
Air Drills, Jackhammers and Drill Steel.

G. A. UNVERZAGT
15 Park Row New York City

SPECIAL BARGAIN

2—No. 20 CATERPILLAR TRACTORS, COMPLETE WITH WINCHES

2—No. 30 CATERPILLAR TRACTORS, COMPLETE WITH WINCHES

THESE TRACTORS WERE PURCHASED NEW IN 1931

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17-19 W. SOUTH ST.
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Used Equipment for Sale

AIR COMPRESSORS: Steam and Electric Driven, 950 ft. to 3300 ft., and Portable Gas Driven Compressors, 110 ft.
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R. R. BRIDGE SPANS: 150 ft. through Truss Span; 80 ft. through Truss Girder; 30 & 40 ft. plate Girder Spans. All "Cooper's E-40."
BOILERS: Scotch Marine 100-250 H.P. Vertical Boilers up to 80 H.P.
CABLEWAYS: Stationary Steel Towers 75 to 150 ft. high—to handle 10 ton loads. Carriages 6 and 10 ton capacity with carriers; Main Cables 2" and 2¼"—1200 to 2000 ft. long.
CARS, R. R.: 100,000 Lb. Capacity Steel Flat Cars, Standard Gauge, 16 yd. and 20 yd. All Steel Air Operated Dump Cars, 12 Yd. Dump Cars—Steel underframe wood bodies.
CRUSHERS: 60" x 84" Superior Jaw Crusher — Gyratory Crushers—Sizes 10" to 20"—Belt driven. Anaconda Crushing Rolls.
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DERRICKS: Stiff Legs—10 Ton Capacity. Barge Derricks 5 and 10 Ton Capacity. Steel Guy Derrick, 20 tons with 115 Ft. Mast, 100 Ft. Boom.
DRILL & DRILL SHARPENERS: 6" Well Drill with Electric Driven Bit Dresser — Ingersoll-Rand E-44 and G-108 Air Piston Drill—No. 5 Leyner Drill Sharpener.
ENGINES—STEAM: Cableway Engines 30 to 110 H.P.—Three drums 60 H.P. Hoist; Double Drum Hoist 12 to 40 H.P.—150 H.P.and 750 H.P. Corliss Engines. A number Stationary Steam Engines.
LOCOMOTIVES: Standard gauge, Saddle Tank Locomotives 27 to 40 tons. Gas Locomotive—5 ton, 36" gauge.
MIXERS: Electric, Steam and Gas driven mixers up to 1 Yd. Capacity. Air pressure grout machines.
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PUMPS: Centrifugal self prime Gas Driven Pumps 3 & 4". Direct Connected Electric Driven High Pressure Pumps up to 10". Belt Driven Centrifugal Sand and Water Pumps. Also numerous steam piston pumps.
SCREENS: Large and Small Revolving Screens, also 3 and 4 ft. Hummer Screens with or without Generator. Crushed Stone Elevators.
STEAM SHOVELS: Railroad—70C Bucyrus and 60 Marion. Caterpillar—31 and 32 Marion and 29 Osgood. Traction Wheels—29 Osgood.
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Hardaway Contracting Company
Columbus, Georgia

1—Bucyrus Erie 2 yd. Diesel crane.
1—Northwest 1½ yd. shovel crane dragline gas.
1—Lorraine 75A shovel and crane.
1—Bucyrus Erie ⅞ yd. steam shovel.
1—Storage bin 500 yd. capacity, Telsmith settling tanks.
2—Whitcomb 20 ton gas locos. 36" ga. rebuilt.
2—Vulcan 20 ton gas loco. 36" ga. rebuilt.
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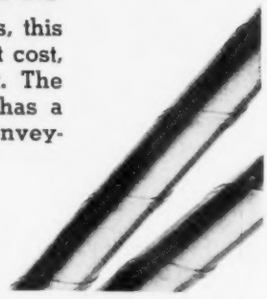

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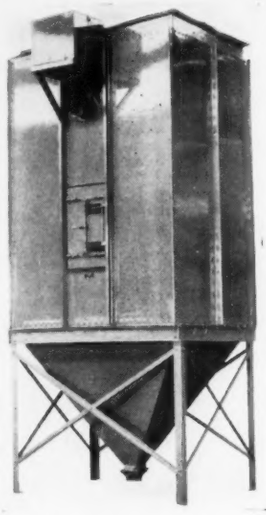

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INDUSTRIAL BROWNHOIST CORP.
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INDUSTRIAL BROWNHOIST
CLAMSHELL BUCKETS

"The Perfect" SUPER-LOY
WOVEN WIRE SCREENS

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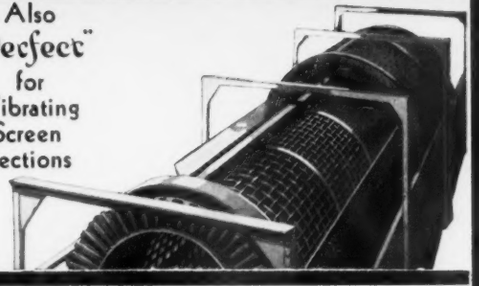

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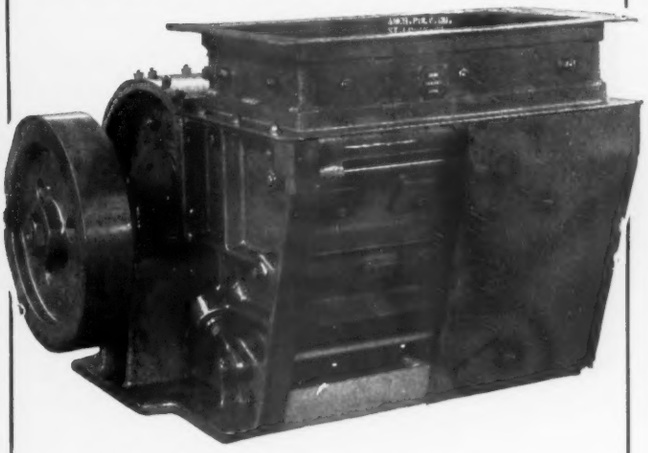
LUDLOW-SAYLOR WIRE CO. ST. LOUIS

AMERICAN HAMMER MILL



Front View Showing Breaker Plate Adjustment

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LOWER OPERATING COST because the AMERICAN has manganese steel grinding parts, alloy steel shaft and SKF spherical roller bearings, thus assuring LOW MAINTENANCE COST. This mill makes a more uniform product with minimum fines and no slivers or chips.

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1936

When Erskine Hazard started the Hazard Wire Rope Company, back in 1846, there were no such things in general use, as:

Hydraulic dredges
Panama Canal
Power shovels
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Air compression drills
Traffic tunnels
Stiff legged derricks
Skyscrapers
High speed elevators
Trip hammers
Deep oil wells
High line timber rigs
Airplanes
Automobiles
Tire chains
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Telephone
Radio
"Korōdless" (stainless) steel

Hazard wire ropes have helped make many of these things.

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WIRE ROPE COMPANY, *Inc.*
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LAY-SET *Preformed* Wire Rope

★ALL HAZARD WIRE ROPES MADE OF IMPROVED PLOW STEEL ARE IDENTIFIED BY THE GREEN STRAND